

DTIC FORM 70A

DOCUMENT PROCESSING SHEET

MX SITING INVESTIGATION

GRAVITY SURVEY - DRY LAKE VALLEY

NEVADA

Prepared for:

U.S. Department of the Air Force Ballistic Missile Office (BMO) Norton Air Force Base, California 92409

Prepared by:

Fugro National, Inc. 3777 Long Beach Boulevard Long Beach, California 90807

17 March 1980

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered) **READ INSTRUCTIONS** REPORT DOCUMENTATION PAGE BEFORE COMPLETING FORM 1. REPORT NUMBER FM-TR-33-DL

4. TITLE (and Subtitle) NIX SITURE (and Subtitle) INCOSTICOTION 5. TYPE OF A 5. TYPE OF REPORT & PERIOD COVERED Fugro National FO4704-80-C-0006 9. PERFORMING ORGANIZATION NAME AND ADDRESS 10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Ertec Western Inc Garmerly Fugre National PC. BCX 7765 64312 F Long Beach Ca 90507 11. CONTROLLING OFFICE NAME AND ADDRESS
U.S. Department of the Air Force
Space and Missile Systems (regarization 12. REPORT DATE 17 1100 30 13. NUMBER OF PAGES 16 CHON AFIS (3 92409 (SAMSO)

14. MONITORING AGENCY NAME & ADDRESS(If different from Controlling Office) 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE 16. DISTRIBUTION STATEMENT (of this Report) Distribution Unlimited 17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, If different from Report) Distribution Unlimited 18. SUPPLEMENTARY NOTES 19. KEY WORDS (Continue on reverse side if necessary and identify by block number Depth to Rock, Valley Fill, Faults, Gravity Profile, Graben abstract (Continue on reverse side if necessary and identify by block number)

Athe gravitational feld were made in Doy Lare Valley to the

propose of estimating the overall shape of the structural

masin and the thickness of allowed fill in the basin. These estimates are expected to be useful to the Nuclear Survivals 11. by + Kardness (NH+S) armmunity in modeling dynamic response to nuclear detainment of to geomydrelling sto in elivation of grand water regimes.

DD FORM 1473 EDITION OF 1 NOV 65 IS OBSOLETE

-- 1555 mg

FOREWORD

Methodology and Characterization Studies during fiscal years 1977 and 1978 included gravity surveys in ten valleys in Arizona (five), Nevada (two), New Mexico (two), and California (one). The gravity data were obtained for the purpose of estimating the gross structure and shape of the basins and the thickness of the valley fill. There was also the possibility of detecting shallow rock in areas between boring locations. Generalized interpretations from these surveys were included in Fugro National's Characterization Reports (FN-TR-26a through e).

During the FY 77 surveys, the measurements were made to form an approximate one-mile grid over the study areas, and contour maps showing interpreted depth to bedrock were made. In FY 79, the decision was made to concentrate the available funds on the basic Verification Program to verify and refine suitable area boundaries. This decision resulted in a reduction in the gravity program. Instead of obtaining gravity data on a grid, the reduced program consisted of obtaining gravity measurements along profiles across the valleys where Verification Studies were also performed.

The Defense Mapping Agency (DMA), St. Louis, was also requested to provide gravity data from their library to supplement the gravity profiles. For Big Smoky, Reveille, and Railroad valleys, a sufficient density of library data is available to permit construction of interpreted contour maps instead of two-dimensional cross sections.

In late summer of FY 79, supplementary funds became available to begin data reduction. At this time, inner zone terrain corrections began on the library data and the profiles from Big Smoky Valley, Nevada, and Butler and La Posa valleys, Arizona. The profile data from Whirlwind, Hamlin, Snake East, White River and Garden Coal valleys, Nevada were available from the field in early October, 1979.

A continuation of gravity interpretations has been incorporated into the FY 80 contract and the results are being summarized in a series of valley reports. The reports covering Nevada-Utah gravity studies will be numbered, "FN-TR-33-", followed by the abbreviation for the subject valley. In addition, more detailed reports of the results of FY 77 surveys in Dry Lake and Ralston valleys, Nevada are being prepared. Verification Studies are continuing in FY 80 and gravity studies are included in the program. DMA will continue to obtain the field measurements and it is planned to return to the grid pattern. The interpretation of the grid data will allow the production of contour maps which will be valuable in the deep basin structural analysis needed for computer modeling in the Water Resources Program. The gravity interpretations will also be useful in the Nuclear Hardness and Survivability (NH&S) evaluations.

The basic decisions governing the gravity program are made by BMO following consultation with TRW Inc., Fugro National and the (DMA). Conduct of the gravity studies is a joint effort between DMA and Fugro National. The field work, including planning, logistics, surveying, and meter operation is done by the Defense Mapping Agency Hydrographic/Topographic Center (DMAHTC), headquartered in Cheyenne, Wyoming. DMAHTC reduces the data to Simple Bouguer Anomaly (see Section Al.4, Appendix Al.0). The Defense Mapping Agency Aerospace Center (DMAAC), St. Louis, calculates outer zone terrain corrections.

Fugro National provides DMA with schedules showing the valleys with the highest priorities. Fugro National also recommended locations for the profiles in the FY 79 studies within the constraints that they should follow existing roads or trails. Any required inner zone terrain corrections are calculated by Fugro National prior to making geologic interpretations.

TABLE OF CONTENTS

																							Ī	age
FOREWORD										•	i													
1.0	INTRO	DUCTI	ON .	•	•	•	•	•	•	•		•	•		•			•	•	•	•	•		1
	1.1 1.2 1.3	Objec Locat Scope	ion	•	•	:			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	1 1 1
2.0	GRAVI	TY DA	TA R	EDU	JCT	CIC	<u>N</u>		•	•	•	•	•	•	•	•	•		•	•	•		•	5
3.0	GEOLO	GIC S	UMMA	RY	•	•	•	•	•				•							•	•			7
4.0	INTER	RPRETA	TION	•				•			•	•		•	•	•			•	•				9
	4.1 4.2 4.3	Regio Densi Model	ty S	e16	ect						•	tí •	.on	•	•	•	•	•		•	•	•		9 9 10
5.0	CONCI	LUSION	<u>s</u> .	•	•					•	•		•	•	•				•		•	•	•	17
BIBLI	OGRAPH	HY		•	•		•	•	•	•			•	•	•				•	•	•	•		18
APPENDIX Al.C General Principles of the Gravity Exploration Method A2.0 List of Gravity Data																								
LIST OF FIGURES																								
Figur Numbe																								
1 2 3 4	7 (Comple /eloci Line	aphi da . te B ty P DL-	ouc roi	et jue Eil	ti er e	Ar fr	om	al s	y Sei	Co Sm	ak nt	e ou	va • • r s • e f	ll ra	ey ct	io	· n	•					2 3 6
5 6 7	I	/eloci Line Interp Cross	DL- rete	DS- d I	-2)e p	oth	1 t	•	Be	dr	•	k	Ma	· p	•		•				•	•	•	12 15

1.0 INTRODUCTION

1.1 OBJECTIVES

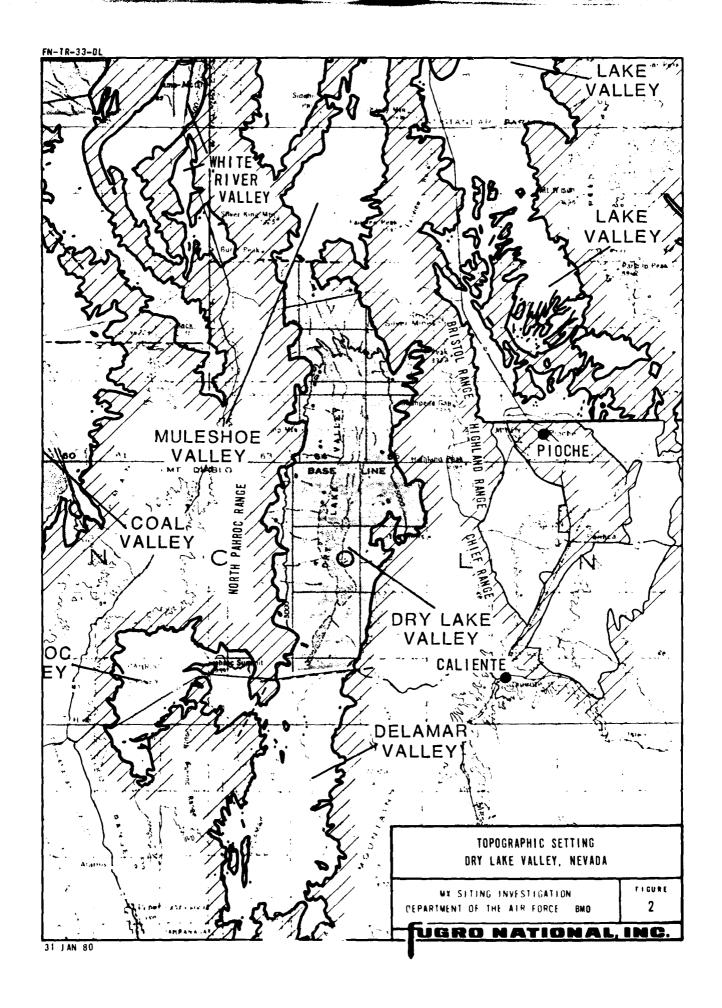
Measurements of the gravitational field were made in Dry Lake Valley for the purpose of estimating the overall shape of the structural basin and the thickness of alluvial fill in the basin. These estimates are expected to be useful to the Nuclear Survivability and Hardness (NH&S) community in modeling dynamic response to nuclear detonations and to geohydrologists in evaluating ground water regimes.

1.2 LOCATION

Dry Lake Valley is located in central Lincoln County, Nevada, approximately 106 miles (170 km) NNE of Las Vegas (see Figure 1). The portion of Dry Lake Valley included in this study is approximately 40 miles (65 km) long and 13 miles (22 km) wide, comprising an area of approximately 520 square miles (1347 km²). As shown in Figure 2, Dry Lake Valley is bounded by mountain ranges on three sides and is open to Delamar Valley on the south. U.S. Highway 93, which is the only paved road in the vicinity, crosses the southern end of the valley.

1.3 SCOPE OF STUDY

The Defense Mapping Agency Hydrographic-Topographic Center/Geodetic Survey Squadron (DMAHTC/GSS) obtained gravitational field measurements at 1069 stations in and around Dry Lake Valley during June and July, 1977. Approximately one-half of these stations were distributed throughout the valley with about 1 mile (1.6 km) between stations. The rest of the stations were

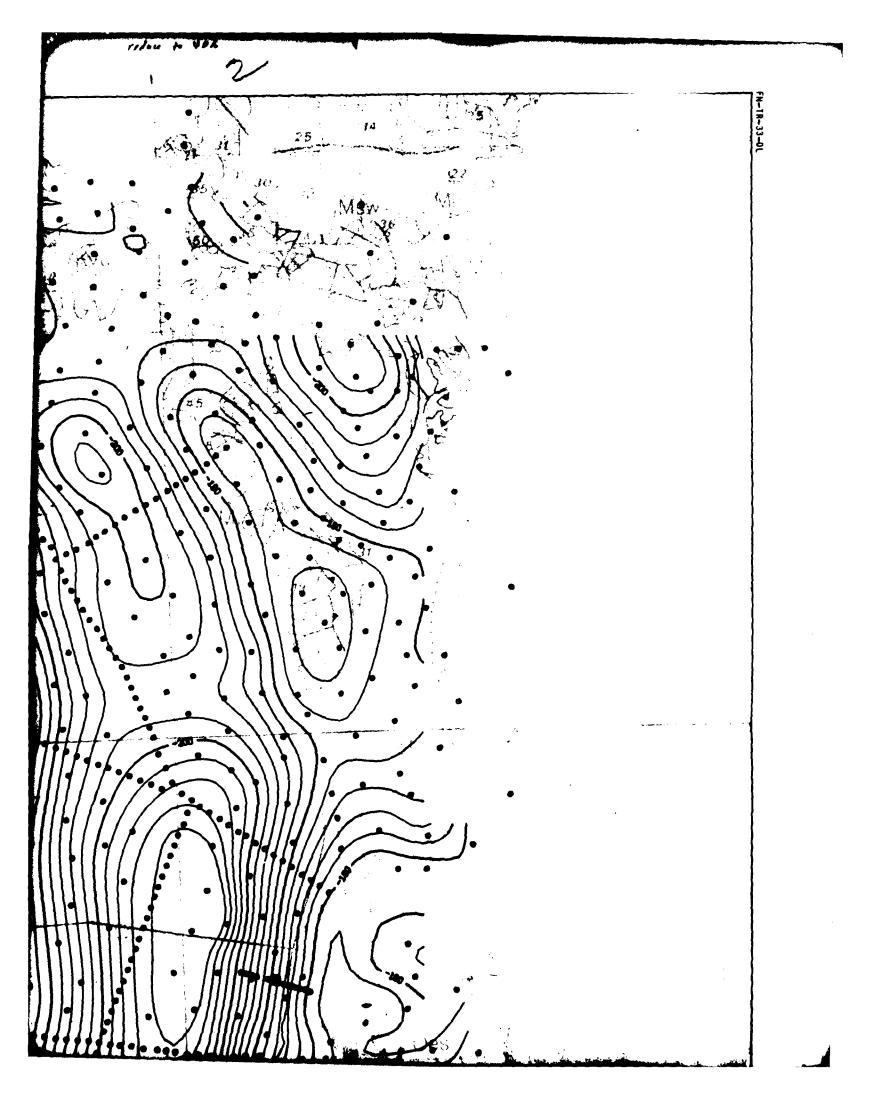


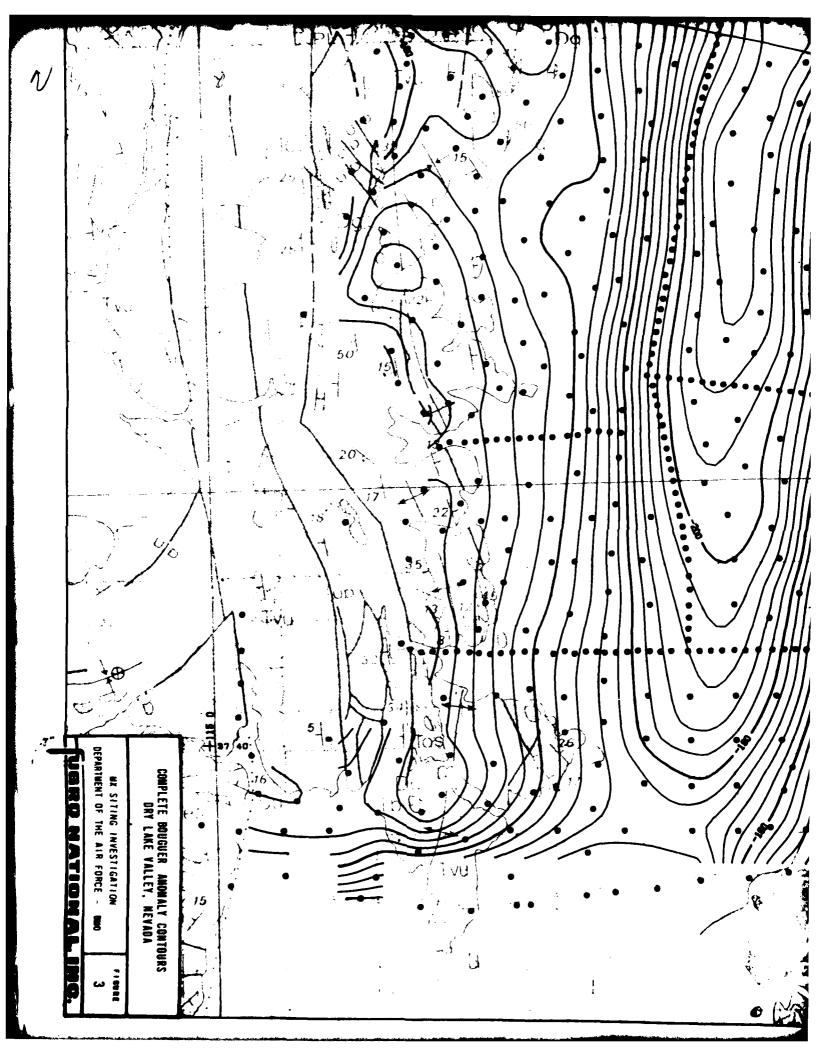
placed either at 1/4-mile (0.4 km) intervals along roads and trails or around the perimeter of the valley on rock outcrops. The station locations are shown on Figures 3 and 6. Station elevations were determined within a tolerance of 5 feet (1.5 m). With this elevation tolerance, the gravity precision is no smaller than 0.3 milligals. The principal facts for all stations are listed in Appendix A2.0.

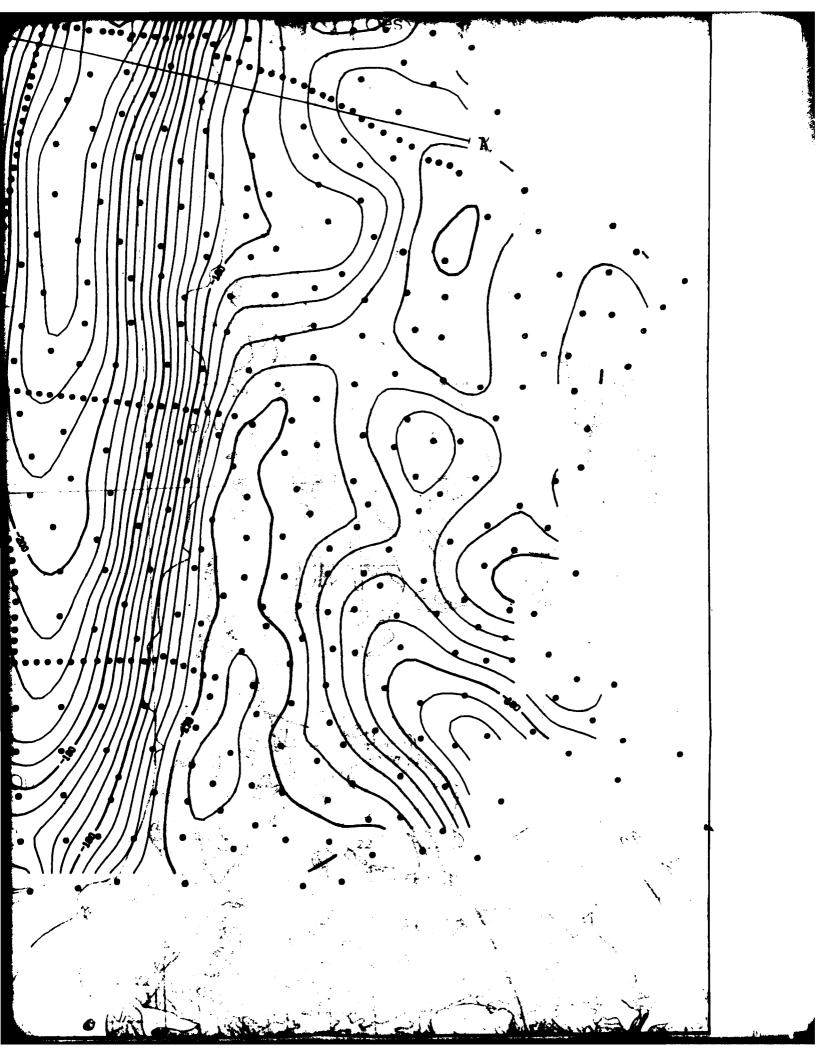
In addition to the gravity data in Dry Lake Valley, information from two relatively long seismic refraction lines in the northern part of the valley was available. These seismic lines were recorded during Characterization studies by Fugro National in June, 1977 (FN-TR-26e).

2.0 GRAVITY DATA REDUCTION

DMAHTC/GSS obtained the basic observations and reduced them to simple Bouquer Anomalies (SBA) for each station as described in Appendix Al.O. Up to three levels of terrain corrections were applied to convert the SBA to the complete Bouguer Anomaly (CBA). First, the Defense Mapping Agency Aerospace Center (DMAAC), St. Louis, used its library of digitized terrain data and a computer program to calculate corrections for all stations to account for terrain to 104 miles (167 km) from the station. The second level of terrain corrections was necessary because the computer program has limitations in accounting for terrain effects near the stations. This made it necessary, for some stations, to use a ring template to calculate the effect of terrain within approximately 3000 feet of these stations. third level of terrain corrections was applied to those stations where 10 feet or more of relief was observed within 130 feet of For these stations, elevation differences were the station. measured in the field at a distance of 130 feet along six directions from the stations. These data were used to calculate the effect of the very near relief. Figure 3 is a contour map of the CBA which also shows the locations of the gravity stations and approximate rock outcrop line at the edges of the valley.







3.0 GEOLOGIC SUMMARY

The structural geologic setting, major rock types, and depositional regime of the valley-fill material are important considerations in the interpretation of the gravitational field data. Dry Lake Valley exhibits typical basin and range structure; high angle, normal basement faults, oriented north-south, probably border the North Pahroc Range on the west, and the Bristol, Highland, and Chief ranges on the east. The area between was faulted downward. Stewart, and Carlson (1978) indicate that a north-south trending fault on the eastern side of the valley cuts through the surface alluvium. This is further substantiated by Shawe (1965) and Fugro National, Inc. (1978, FN-TR-26E). Shawe (1965) also mentions transverse faults, near the Dry Lake area, occurring at large angles to the major north-south structural trends.

The outcrops in the mountains on the western side of the valley are predominantly Tertiary ash flow tuffs with some Paleozoic carbonate rocks. Conversely, the eastern mountains are composed primarily of Paleozoic carbonates with minor amounts of Tertiary ash flow tuffs (Stewart, and Carlson, 1978). The Paleozoic carbonate rocks in Nevada are generally reported to be relatively high density, on the order of 2.8 g/cm³. The volcanic rocks in Nevada are highly variable in density. In general, their density ranges fall between 2.2 and 2.5 g/cm³.

At the surface, the total valley fill is composed of young and intermediate age alluvial fan deposits (72 percent of surface

area), fluvial and stream terrace deposits (16 percent), playa and older lacustrine deposits (six percent), and undifferentiated fluvial, alluvial, and lacustrine deposits (six percent), (Fugro National, Inc. 1978, FN-TR-26e). Except for younger stream channel and playa deposits, the valley fill is late Tertiary and early Quaternary in age. Eakin (1963) describes, the valley fill as consisting of unconsolidated to partly consolidated silt, sand, and gravel derived from adjacent highlands, and including some rocks of volcanic origin.

4.0 INTERPRETATION

The gravitational effect of the light weight material filling the Dry Lake structural basin dominates the CBA map in Figure 3. The CBA values become increasingly negative toward the center of the valley.

4.1 REGIONAL-RESIDUAL SEPARATION

A fundamental step in gravity interpretation is evaluation of the portion of the CBA which represents the geologic feature of interest, in this case, the relatively low density valley fill. The part of the gravity field which is of interest is called the "residual" anomaly. The magnitude of the residual anomaly is a product of: 1) the thickness of alluvial fill; and 2) the contrast in density between the fill and bedrock.

The residual anomaly was isolated by first estimating the way the CBA field would have appeared if there had been no valley fill present. This estimated field is called the "regional" gravity. For this study, the regional field was calculated by fitting (by least squares) a second-order polynomial surface to the CBA values at the bedrock stations around the valley. The regional field was then subtracted from the CBA. The remainder was the residual anomaly.

4.2 DENSITY SELECTION

To calculate the thickness of alluvium which caused the residual anomaly, it is necessary to know the density contrast between the alluvial fill and the bedrock. Only very generalized

information on densities is available, and, for calculation, they were treated as if they are constant throughout the valley. Upon consideration of these factors, it becomes clear that the thickness of alluvium (or depth to rock) interpretation is a coarse approximation.

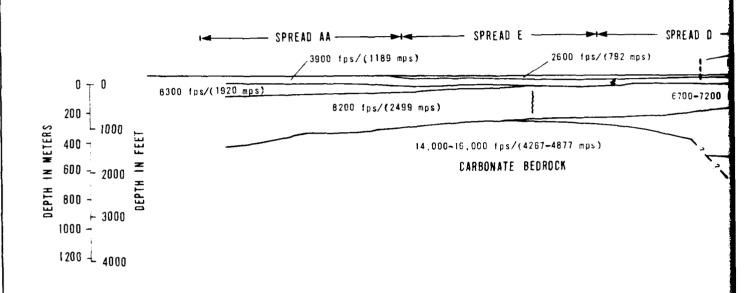
Interpretations from the two seismic refraction lines in the northern end of the valley were used to constrain the selection of the density contrast. These interpretations are shown in Figures 4 and 5. The highest velocities in the profiles are on the order of 15,000 fps (4572 mps). These were interpreted to represent carbonate bedrock. By "trial and error" calculations, it was found that use of a density contrast of 0.45 g/cm³ caused the depth calculated from the gravity to approximately agree with the seismic interpretation.

The density measured for samples of alluvial fill obtained from shallow borings in Dry Lake Valley range from 2.1 g/cm^3 to 2.4 g/cm^3 . Published values for carbonate rocks typically range between 2.6 and 2.8 g/cm^3 . The contrast of 0.45 g/cm^3 appears to be reasonable in light of these typical values. This contrast should be considered a maximum, because the average density of the alluvial materials will become greater as the depth of burial increases.

4.3 MODELING

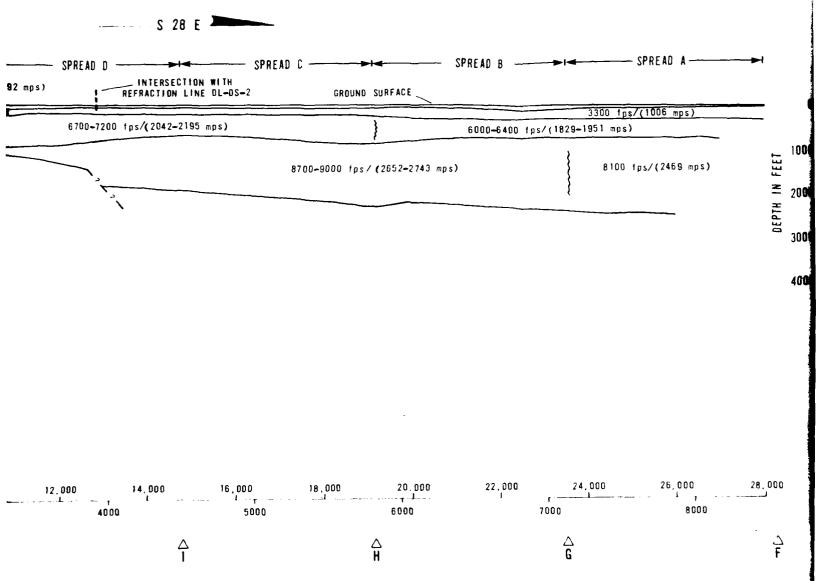
For computation and contouring, values for surface elevations and CBA were interpolated at the nodes of a regular 1 mile (1.6 km) grid over the valley. Portions of the grid, where

SEISMIC F



DISTANCE IN FEET OF LOGICAL DISTANCE IN METERS		4000 6000 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	8000	10,000 r1 3000	12,000 1 - 1 400 0
SHOT POINT LOCATIONS	A C	K		\triangle	

VELOCITY PROFILE SEISMIC REFRACTION LINE DL-DS-1



VELOCITY PROFI SEISMIC REFRACTION LI DRY LAKE VALLEY

MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE -

UGRO NATIO

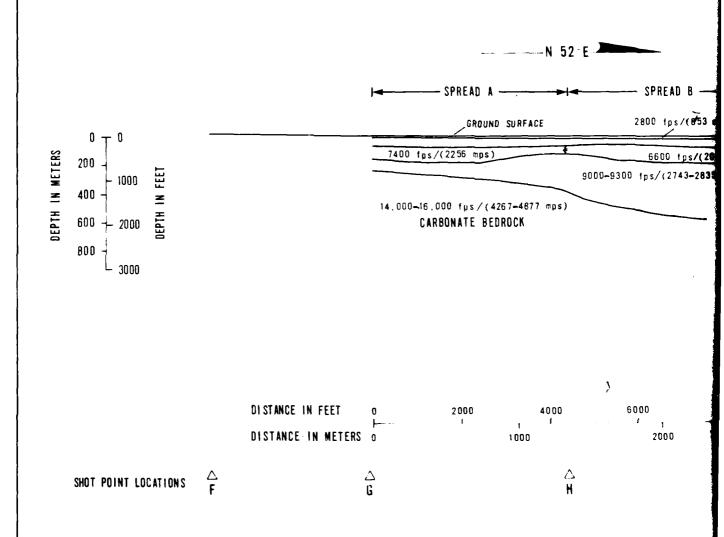
12

1

- SPREAD A-0 7 0 3300 tps/(1006 mps) - 200 **f** tps/(1829=1951 mps) 1000 - 400 E 2000 - 600 E - 800 3000 -8100 tps/(2469 mps) 3000 -- 1000 4000 - 1200 26,000 24,000 8000 7000 $_{\mathbf{G}}^{\triangle}$ VELOCITY PROFILE SEISMIC REFRACTION LINE DL-DS-1 DRY LAKE VALLEY NEVADA FIGURE MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE

1

VELOCITY PROFILE SEISMIC REFRACTION LINE DL-DS-2



31 JAN 80

1

VELOCITY PROFILE REFRACTION LINE DL-DS-2 ---N 52 E SPREAD B -INTERSECTION WITH REFRACTION LINE DL-DS-1 SURFACE 13850 fps/(1173 mps) 6600 fps/(2012 mps) 9000-9300 fps/(2743-2835 mps) 1000 400 **267-4**877 mps) ROCK 2000 600 800 3000 4000 6000 14.000 J 8000 10,000 12.000 4.1 1000 2000 3000 4000 \triangle ∇ VELOCITY PROFILE SEISMIC REFRACTION LINE DL-DS-2 DRY LAKE VALLEY, NEVADA

FIGURE

5

MX SITING INVESTIGATION

DEPARTMENT OF THE AIR FORCE

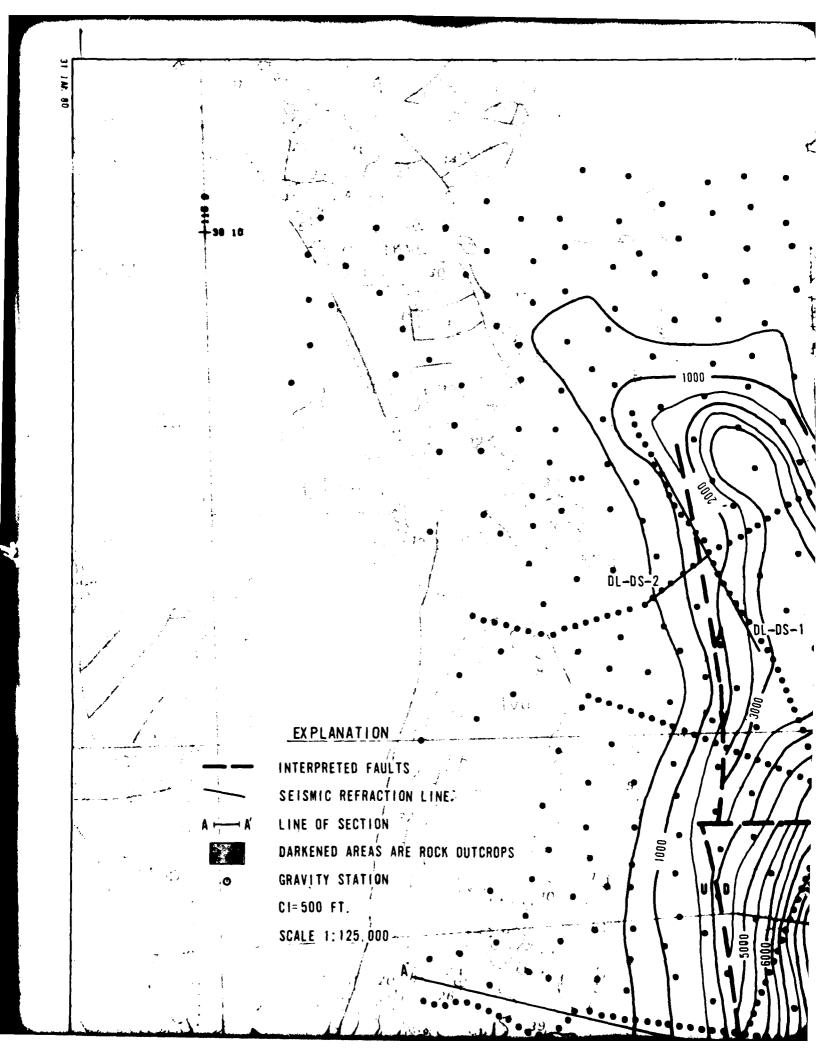
there were insufficient station data to establish reliable nodal values, were masked out.

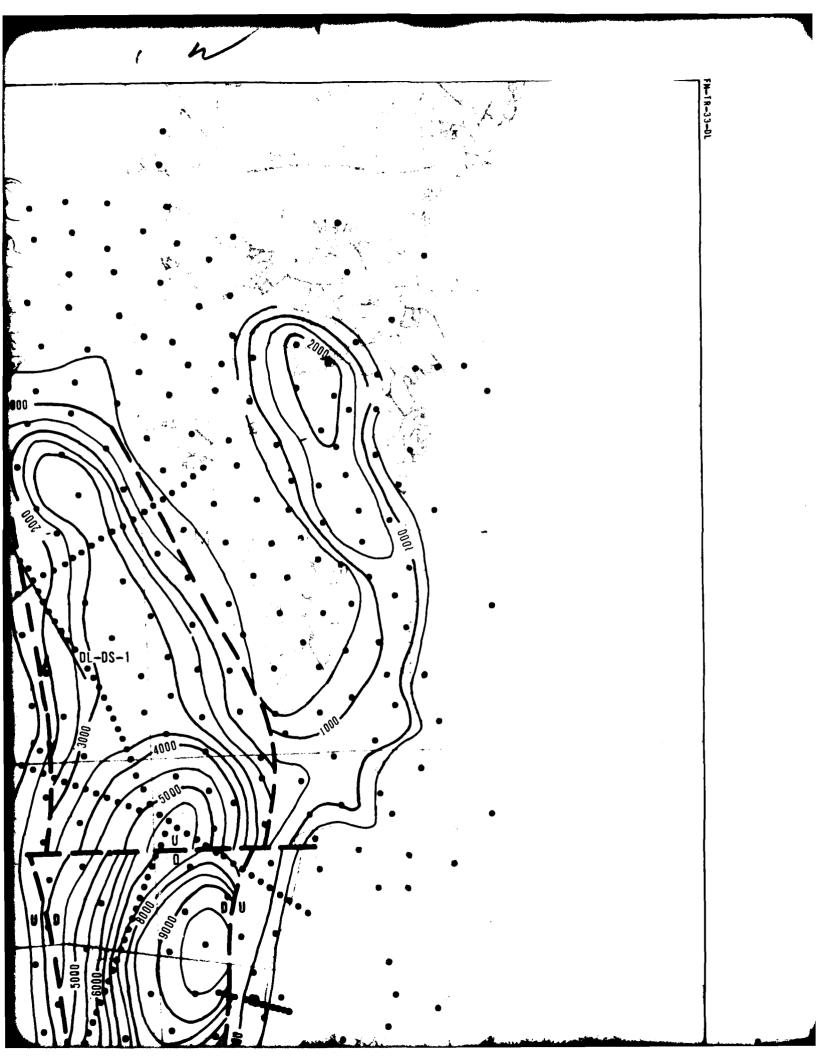
Bedrock depths at each node were computed by iterative computer programs that considered the gravity effect from the model at the other nodes as well as beneath the node in question. Contours showing the interpreted depth to bedrock are displayed in Figure 6. The CBA contours in Figure 3 show linear gradients along both sides of the valley. These gradients range from 10 to 14 milligals per mile. These gradients are thought to be produced by large, steep bedrock faults. The second vertical derivative of the CBA field was calculated to guide the placement of the faults shown in Figure 6. Since the zero contour of the second vertical derivative marks the steepest part of the input CBA field, the faults were placed along the zero contour. This places the trace of the eastern boundary fault slightly more than 1 mile (1.6 km) west of surface cracks in the alluvium mapped as a fault along the eastern boundary of Dry Lake Valley.

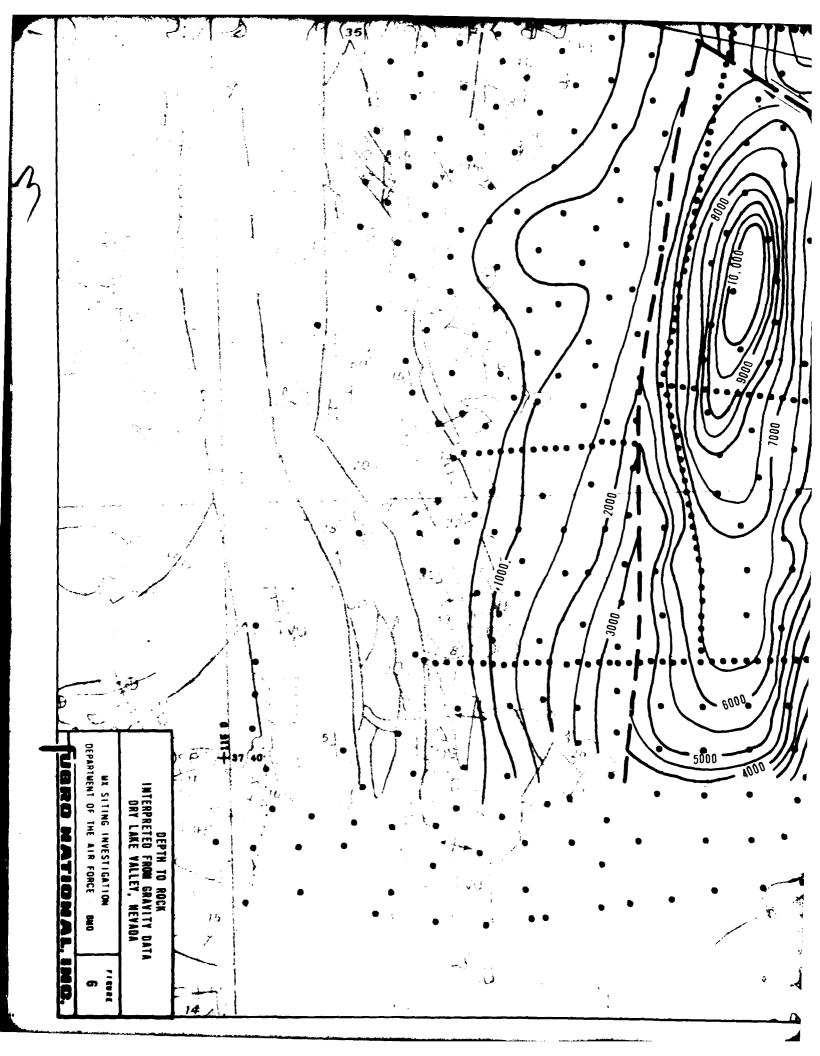
The two faults interpreted to cross the valley are not so clearly defined as the boundary faults. They are positioned where changes in strike of the major gravity gradients and the axis of the valley occur. There is significant change in bedrock elevation associated with the northern transverse fault, but little, if any vertical change across the southern fault.

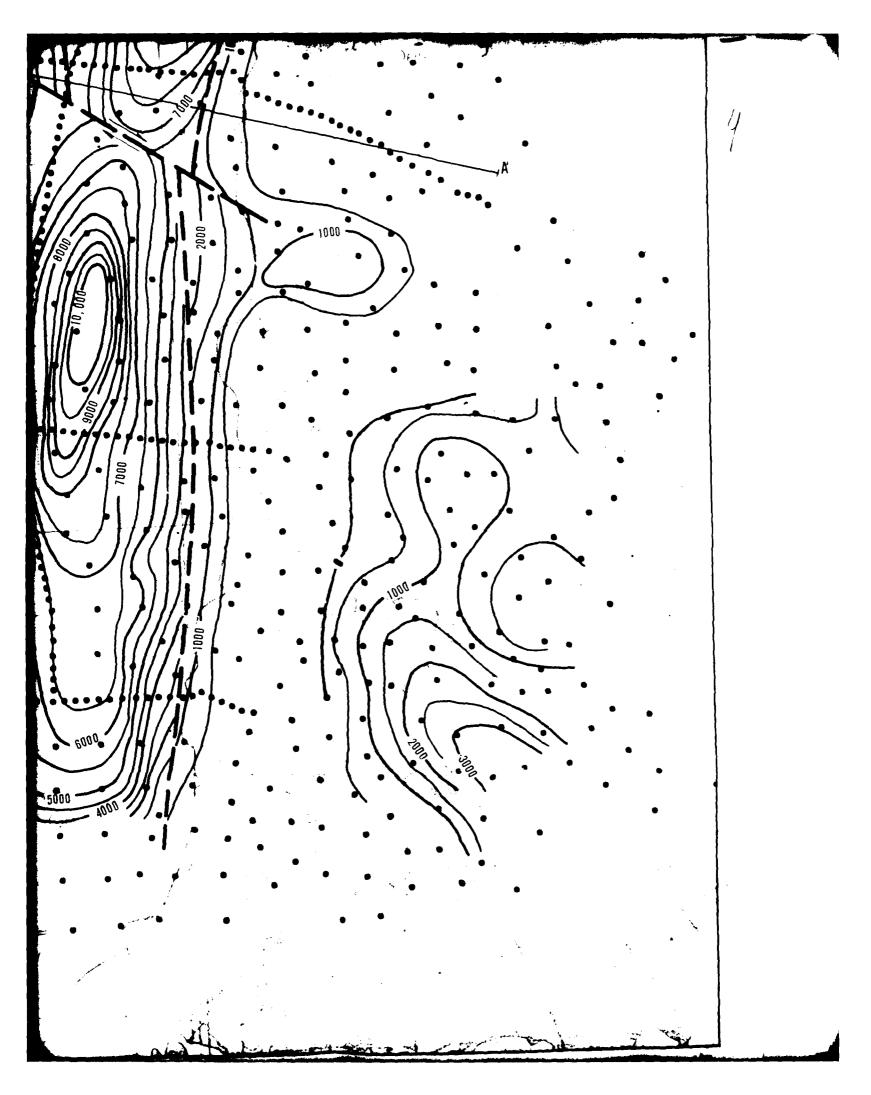
A cross-section view across the central part of the valley (Section AA', Figures 3 and 6) is shown in Figure 7. The top

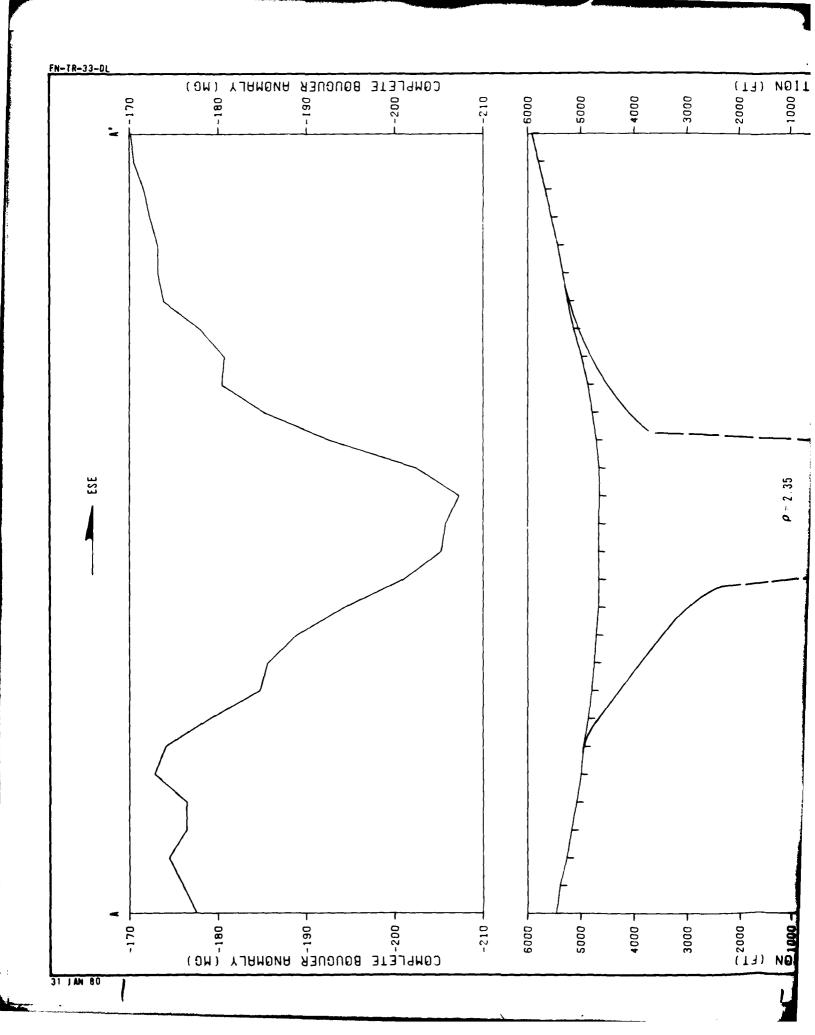
part of the figure shows the shape of the CBA profile along this section. The lower part shows the surface profile and the interpreted bedrock profile.

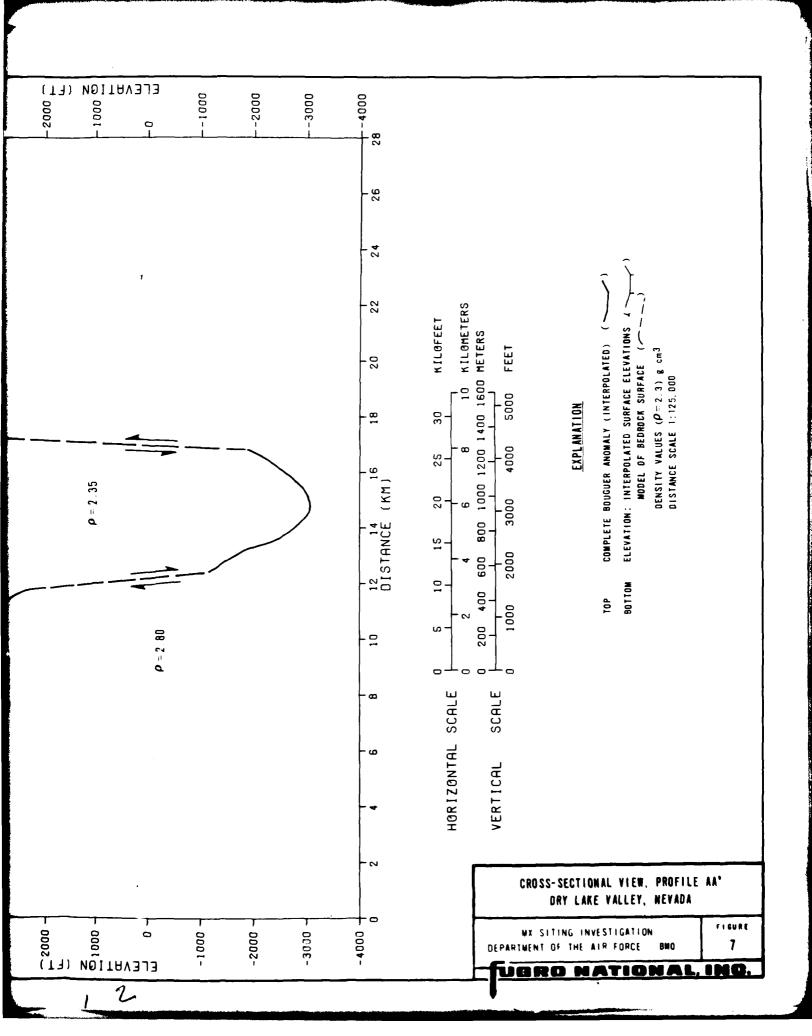












5.0 CONCLUSIONS

The interpretation of the gravity survey of Dry Lake Valley indicates that there are major range bounding normal faults on both sides of the valley. The graben between the boundary faults is calculated to be on the order of 10,000 feet deep. The northern third of the valley is substantially shallower than the southern part.

There is a large, well defined negative gravity anomaly associated with Dry Lake Valley. An average density contrast of 0.45 g/cm³ between the alluvium and bedrock was used to calculate the thickness of alluvium which would create such an anomaly. If a smaller contrast had been used, the calculated thickness would have been greater. Conversely, if a larger contrast had been used, the calculated thickness would have been smaller.

Additional modeling with other density contrasts was not justified because so little is known about the actual density distribution in and around the valley.

If future studies acquire better density data or actual thicknesses of alluvium in relatively deep parts of the basin, the gravity interpretation can be refined and made more accurate.

BIBLIOGRAPHY

- Eakin, T.E., 1963, Ground Water Appraisal of Dry Lake and Delamar Valleys: U.S. Geol. Survey, Ground Water Resources Reconnaissance Series, Report 16, 24 p.
- Fugro National, Inc. 1978, MX siting investigation geotechnical summary prime characterization sites, Great Basin Candidate Siting Province Report, 70 p., 4 appendices (FN-TR-26e).
- Shawe, D.R., 1965, Strike-slip control of basin-range structure indicated by historical faults in Western Nevada: Geological Society of America Bulletin, Vol. 76, pp. 1361-1378.
- Stewart, J.H., and Carlson, J.E., 1978, Geologic Map of Nevada: U.S. Geol. Survey, 1:500,000.

APPENDIX A1.0

GENERAL PRINCIPLES OF THE GRAVITY EXPLORATION METHOD

A1.0 GENERAL PRINCIPLES OF THE GRAVITY EXPLORATION METHOD

A1.1 GENERAL

A gravity survey involves measurement of differences in the gravitational field between various points on the earth's surface. The gravitational field values being measured are the same as those influencing all objects on the surface of the earth. They are generally associated with the force which causes a 1 gm mass to be accelerated at 980 cm/sec². This force is normally referred to as a 1 g force.

Even though in many applications the gravitational field at the earth's surface is assumed to be constant, small but distinguishable differences in gravity occur from point to point. In a gravity survey, the variations are measured in terms of milligals. A milligal is equal to 0.001 cm/second² or 0.00000102 g. The differences in gravity are caused by geometrical effects, such as differences in elevation and latitude, and by lateral variations in density within the earth. The lateral density variations are a result of changes in geologic conditions. For measurements at the surface of the earth, the largest factor influencing the pull of gravity is the density of all materials between the center of the earth and the point of measurement.

To detect changes produced by differing geological conditions, it is necessary to detect differences in the gravitational field as small as a few milligals. To recognize changes due to

geological conditions, the measurements are "corrected" to account for changes due to differences in elevation and latitude.

Given this background, the basic concept of the gravitational exploration method, the anomaly, can be introduced. If, instead of being an oblate spheroid characterized by complex density variations, the earth were made up of concentric, homogeneous shells, the gravitational field would be the same at all points on the surface of the earth. The complexities in the earth's shape and material distribution are the reason that the pull of gravity is not the same from place to place. A difference in gravity between two points which is not caused by the effects of known geometrical differences, such as in elevation, latitude, and surrounding terrain, is referred to as an "anomaly."

An anomaly reflects lateral differences in material densities. The gravitational attraction is smaller at a place underlain by relatively low density material than it is at a place underlain by a relatively high density material. The term "negative gravity anomaly" describes a situation in which the pull of gravity within a prescribed area is small compared to the area surrounding it. Low-density alluvial deposits in basins such as those in the Nevada-Utah region produce negative gravity anomalies in relation to the gravity values in the surrounding mountains which are formed by more dense rocks.

The objective of gravity exploration is to deduce the variations in geologic conditions that produce the gravity anomalies identified during a gravity survey.

Al.2 INSTRUMENTS

The sensing element of a LaCoste and Romberg gravimeter is a mass suspended by a zero-length spring. Deflections of the mass from a null position are proportional to changes in gravitational attraction. These instruments are sealed and compensated for atmospheric pressure changes. They are maintained at a constant temperature by an internal heater element and thermostat. The absolute value of gravity is not measured directly by a gravimeter. It measures relative values of gravity between one point and the next. Gravitational differences as small as 0.01 milligal can be measured.

A1.3 FIELD PROCEDURES

The gravimeter readings were calibrated in terms of absolute gravity by taking readings twice daily at nearby USGS gravity base stations. Gravimeter readings fluctuate because of small time-related deviations due to the effect of earth tides and instrument drift. Field readings were corrected to account for these deviations. The magnitude of the tidal correction was calculated using an equation suggested by Goquel (1954):

 $C = P + N\cos \phi (\cos \phi + \sin \phi) + S\cos \phi (\cos \phi - \sin \phi)$ where C is the tidal correction factor, P, N, and S are time-related variables, and ϕ is the latitude of the observation point. Tables giving the values of P, N, and S are published annually by the European Association of Exploration Geophysicists.

The meter drift correction was based on readings taken at a designated base station at the start and end of each day. Any difference between these two readings after they were corrected for tidal effects was considered to have been the result of instrumental drift. It was assumed that this drift occurred at a uniform rate between the two readings. Corrections for drift were typically only a few hundredths of a milligal. Readings corrected for tidal effects and instrumental drift represented the observed gravity at each station. The observed gravity values represent the total gravitational pull of the entire earth at the measurement stations.

A1.4 DATA REDUCTION

Several corrections or reductions are made to the observed gravity to isolate the portion of the gravitational pull which is due to the crustal and near-surface materials. The gravity remaining after these reductions is called the "Bouguer Anomaly." Bouguer Anomaly values are the basis for geologic interpretation. To obtain the Bouguer Anomaly, the observed gravity is adjusted to the value it would have had if it had been measured at the geoid, a theoretically defined surface which approximates the surface of mean sea level. The difference between the "adjusted" observed gravity and the gravity at the geoid calculated for a theoretically homogeneous earth is the Bouguer Anomaly.

Four separate reductions, to account for four geometrical effects, are made to the observed gravity at each station to arrive at its Bouguer Anomaly value.

a. Free-Air Effect: Gravitational attraction varies inversely as the square of the distance from the center of the earth. Thus corrections must be applied for elevation. Observed gravity levels are corrected for elevation using the normal vertical gradient of:

FA = -0.09406 mg/ft (-0.3086 milligals/meter) where FA is the free-air effect (the rate of change of gravity with distance from the center of the earth). The free-air correction is positive in sign since the correction is opposite the effect.

b. Bouguer Effect: Like the free-air effect, the Bouguer effect is a function of the elevation of the station, but it considers the influence of a slab of earth materials between the observation point on the surface of the earth and the corresponding point on the geoid (sea level). Normal practice, which is to assume that the density of the slab is 2.67 grams per cubic centimeter was followed in these studies. The Bouguer correction (B_c), which is opposite in sign to the free-air correction, was defined according to the following formula.

 $B_C = 0.01276 (2.67) h_f (milligals per foot)$

 $B_C = 0.04185$ (2.67) h_m (milligals per meter)

where $\mathbf{h}_{\mathbf{f}}$ is the height above sea level in feet and $\mathbf{h}_{\mathbf{m}}$ is the height in meters.

c. Latitude Effect: Points at different latitudes will have different "gravities" for two reasons. The earth (and the geoid) is spheroidal, or flattened at the poles. Since points at higher latitudes are closer to the center of the earth than points near the equator, the gravity at the higher latitudes is larger. As the earth spins, the centrifugal acceleration causes a slight decrease in gravity. At the higher latitudes where the earth's radii are smaller, the centrifugal acceleration diminishes. The gravity formula for the Geodetic Reference System, 1967, gives the theoretical value of gravity at the geoid as a function of latitude. It is:

g = 978.0381 (1 + 0.0053204 $\sin^2 \phi$ - 0.0000058 $\sin^2 2\phi$) gals where g is the theoretical acceleration of gravity and ϕ is the latitude in degrees. The positive term accounts for the spheroidal shape of the earth. The negative term adjusts for the centrifugal acceleration.

The previous two corrections (free air and Bouguer) have adjusted the observed gravity to the value it would have had at the geoid (sea level). The theoretical value at the geoid for the latitude of the station is then subtracted from the adjusted observed gravity. The remainder is called the Simple Bouguer Anomaly (SBA). Most of this gravity represents the effect of material beneath the station, but part of it may be due to irregularities in terrain (upper part of the Bouguer slab) away from the station.

d. Terrain Effect: Topographic relief around the station has a negative effect on the gravitational force at the station. A nearby hill has upward gravitational pull and a nearby valley contributes less downward attraction than a nearby material would have. Therefore, the corrections are always positive. Corrections are made to the SBA when the terrain effects were 0.1 milligal or larger. Terrain corrected Bouguer values are called the Complete Bouguer Anomaly (CBA). When the CBA is obtained, the reduction of gravity at individual measurement points (stations) is complete.

A1.5 INTERPRETATION

The first step in interpretation is to separate the portion of the CBA that might be caused by the lightweight, basin-fill material overlying the heavier bedrock material which forms the surrounding mountains and presumably the basin floor. Since the valley-fill sediments are absent at the stations read in the mountains, the CBA values at these bedrock stations are used as the basis for constructing a regional field over the valley. A regional field is an estimation of the values the CBA would have had if the light weight sediments (the anomaly) had not been there.

The difference between the CBA and the regional field is called the "residual" field or residual anomaly. The residual field is the interpreter's estimation of the gravitational effect of the geologic anomaly. The zero value of the residual anomaly is not exactly at the rock outcrop line but at some

distance on the "rock" side of the contact. The reason for this is found in the explanation of the terrain effect. There is a component of gravitational attraction from material which is not directly beneath a point.

If the "regional" is well chosen, the magnitude of the residual anomaly is a function of the thickness of the anomalous (fill) material and the density contrast. The density contrast is the difference in density between the alluvial and bedrock material. If this contrast were known, an accurate calculation of the thickness could be made. In most cases, the densities are not well known and they also vary within the study area. In these cases, it is necessary to use typical densities for materials similar to those in the study area.

If the selected average density contrast is smaller than the actual density contrast, the computed depth to bedrock will be greater than the actual depth and vice-versa. The computed depth is inversely proportional to the density contrast. A ten percent error in density contrast produces a ten percent error in computed depth. An iterative computer program is used to calculate a subsurface model which will yield a gravitational field to match (approximately) the residual gravity anomaly.

APPENDIX A2.0

LISTS OF GRAVITY DATA

DRY LAKE VAILEY GRAVITY STATIONS

STATION LAT. LONG. ELEV. TER-COR. NORTH EAST URSV THEC MAA CBA IDENT. DEG MIN DEG MIN +CODE TNJUU1 NTH MILL GRAV GHAV +1000 DL1 +38 767+1145234 53/74 0 127422193 68649148289200331 98562 80349 Drs +38 771+1145117 52254 0 107422204 68620149343200338 98179 80465 +38 793+1145015515911 0 103422249 68966149801200370 97983 80490 DL3 +38 833+114490751509T 0 119422323 68493149894200428 97943 80493 DL4 +38 808+1144852 56344 0 194422282 69206147022200391 99654 60536 DLS +38 807+1144744 52798 0 111422284 69364149231200390 98522 86628 DL6 11/422271 69530148685200377 98583 89477 +38 798+1144630 5342R DL7 DL8 +38 751+1144505, 5548Y 114422189 69715147527200306 99434 60525 n DL9 115422391 69645146910200469 99757 80551 +38 861+1144550 56051 U DL 10 +38 880+1144672 56006 112422421 69465147333200497 99540 60552 0 DL11 0 111422440 69317147360200515 49399 80465 +38 892+1144773 5584Y DL12 +38 R99+1144898 52510 106422449 69135149690200525 98584 60780 +38 914+1144999518601 133422473 68486149423200547 48182 80627 DL13 DL 14 +38 869+11/15118 53044 110422386 68614148775260480 48212 00231 DL 15 +38 848+1145199 53850 110422344 6869/149051200450 99286 81027 OLID +38 929+1145195 54384 122422494 68699146263200569 98873 60447 +38 955+1145116 53541 126422545 68314148625200607 98406 80271 DL 17 0 66 152422521 64680147274200584 99253 80423 PLIR +38 939+1144934 5585V +38 966+114463/ 54694 94422575 69221148317200623 59165 80606 DL 19 +38 944+1144069 58261 DLSU 0 13[422540 0946/14593(2005911(0172 50432 175422547 69624145194200594100454 80390 +38 946+1144558 59344 DL21 01.22 +38 991+1144572 58474 119422030 09007145911200659100281 30457 n DL23 97422688 69480147027200708 99287 60188 +381024+1144658 562RY DL24 +3H1013+1144752 5449Y 0 124422665 69343148416200691 99001 60544 DL 25 +381034+1144876 50324 47 112422699 69161146677200723 99159 80108 DL 26 +381003+1144982 52254 -129422638 69007149752200677 96249 80557 U DL 27 +381011+1145128 5424Y 10 123422648 68794145377200669 98735 80359 DL26 +381012+1145223 55804 0 137422647 58655147812200690 99637 80743 DL 30 +381104+1145069 54454 0 128422022 68676148536200025 98958 30514 +381090+1144957 52711 PL 31 126422800 69040149615200605 97818 79060 ODL 32 +381074+1144762 56474 114422777 69325146461200781 49297 79961 0433 +381084+1104672 55344 0 101422/99 6945614/100200795 99147 80-73 'DL 34 +381079+1144570 5711Y 0 104422193 6960614/216260786160171 80/96 55+1145100 51534 158420881 68876149419199296 99124 61707 PL 36 +38 0 DL 38 +34 113420928 68896149925199327 99188 61691 80+1145084 51630 ni. 39 160420912 68935150360199313 98949 61746 + 38 71+1145059 50900 DL40 + 38 63+1145033 50430 124420694 68973150501199302 98659 61533 DL 41 + 38 116420684 69013150512199290 98277 61339 55+1145000 5000C Ú, 438 DL 42 45+11/1/980 49620 113420868 69052150466199277 98205 81475 () DL43 +38 38+1100954 49220 108420694 69090151582199265 98638 81956 30+114/1928 49259 DL 44 +38 105429846 69126151/14149253 93510 62117 . .0 4 TH DL.45 51+1144905 445A2 108950826 90167152018190540 94106 85935 DL 46 +38 13+11/4878 48483 111429811 69202151697199628 93293 61464 +38 103420795 69244151647199216 93000 61588 DL47 3+1144656 48425 DLAH + 38 63+11444883 48744 104420903 80193151645199302 94412 81893 DL 49 +38 125+1144937 49420 98421V16 69111151345199392 94502 81744 01.50 +38 134+1145032 51344 99421624 66972150630199465 48460 61546 0 113421691 64458150659199656 09445 61470 DL51 +36 169+1145104 51924 +38 211+1145229 52574 11.52 0 119421169 500001149517149510 60534 61723 DL 53 +36 205+1145198 52296 6 115421155 Edizola9025199509 99520 81810 +38 203+1105166 52034 PL54 6 119421152 88176152 96148508 49546 81413 +3A 215+1145141 517AH 108421175 68869150314149523 90552 81497 01.55 +34 219+1145114 51476 DL56 0 121421184 63848150510149530 94419 81445 +38 225+11/15/1AH 51226 102421106 6304615-008140534 40274 41435 01.57 ATTICK FORE LAND WORLD L and the Committee of the Committee of the

STATED	N LAT.	LONG A	- 1 - 1 1	Trn=c	വല ഉ	15 T =	FAST	URSV	THEL	- 42	~
IDENT	DEG MIN	DEG MIN	TCODE			ijym ijym	FAST UIM	GRAV	GRAV		
		787777	7011/10		777						+1000
	• • • •				,		44.444		4 4 4 4 4 4 4		44144
DL59	+38 237	1145034	50728	C	9842	1220	68964	159551	199550	98758	81556
DL60		+1145007		ø	9542	1232	69004	150046	199565	93507	01476
DL61		1144979	50266	6	9542	-			149573		
DL02		1144942	50021	0	4242	•			199585		
DL63		+1145003	5050B	-	10042	-			109495		
01.64		1144097	49574	Ü	9342				199523		01450
0665		1144857		Ô	9942	• • • • • • • • • • • • • • • • • • • •		151595		95370	81715
DLóo		1144796	48858	1)	9942	•			199375		61106
DLn7		+11007A0	48465	0	9642				199243		
01.68	-	+1144672	48348	G	9742				199223		
DL69		+1144719	-	ti	9742	-		150340		96783	
0170		114/558	48235	υ	10742	-		150326		_	80151
DL71		1144567	-	•	11042			150394		96590	_
DL 72		1144577	49368	•				150444		90004	89506
DL73		1144587	48428		103420			150454		95721	00310
0L74		1144597	48478		10442			150463		96747	60319
DL 75	**	+1144607	48555		10145			150422		96752	80297
DL76		+1140017	48678		10742			150336		95749	80256
DL 77		1144626	48785		10042			150243		96730	60144
DL78		11111613	48875		10042	_		150164		-	80140
DL 79		1144657	48975		17242			150116	-	9r12h	80127
DL80		1144072	49048	Ċ	9942				199502		00120
0181		1144086	49110	ñ	9542			150104		96791	00130
DL85		+1144705	49228	0	9642	• • • • • • • • • • • • • • • • • • • •			199550	90916	80227
DL83		1144/19	49308	0	9642			150136		97601	80282
0184		1144732	49378	Q.	9442				199612		80310
DL85		1140747	19455	0	95/12			150250		97157	80386
DLHo		1144/60	49575	0	9242			150374		97297	
0187		+1144771	490h8	Ů	9042	-		150356		97317	8054)
DEBB		1144782	497211	งั	9142	•		150426	-	97480	83613
DLAG		1144821	4908Y	o	9042			150588		97549	
0190		1144845	49065	0	9146				199670	-	
0L91		1114477	495811	'n	-	-			109644		-
00.92		1144900	49728	(ı	9242				149025		21.535
NE 93		5561011	49890	n	-				190004	-	
DL 94		1144758	-	c	_				199464		
DL 95		1144814		0					199517		
01.90		1144521		, ì					199345		
UL97		1144525	4859Y	-	-	•		-	1994.14		
DL98		1144594	4900Y						140544		
DL99		1104057	44354						199656		50108
DL100		11144561	497AC	-	11302	1443	09051	149000	99720		
DL101		1144756	49528	0					199743		
DL102		1144730	49715	į1					199196		
0L103		11/1/702	49070	O	4442	1505	0.1444	وفارهوا	199/13	9/008	4000
DL104	_	SHOUNTE	49708	11					199788		
01105	+38 405	+1144561	43424						19403		
01106		+1144035	49945						199822		
PL 107		1144011	50695						197641		
DL108			59238						19000		
DL100		11144554			-				149375	•	•
DLIIN		11110532			11,42				149892		
PL111		1144504				-			199913		
01112	+38 579	5014411	49423	Ø	9142				149764		
DLIII	43h 491	1144813	49385	()	9242	1714			99720		
DL114	+35 413	1190430	50000	13					1 40413		
11115		4.4		,					• •		,

```
STATION
                                                                                      THEC
             LAT.
                        LONG. ELEV. TER-POR. WORTH FAST
                                                                             DASV
                                               INJOUT DITH
IDENT. DEG MIN DEG MIN +CODE
                                                                             GRAV
                                                                     (1 PM
                                                                                      GRAV
DL116
           +38 448+1144664 50205
                                                     91421016 69204150015199865 97993 80902
                                                 ()
DL117
           +38 468+1144876 50278
                                                     94421652 69185150481199894 97396 86845
                                                 Ü
DLIIA
           +38 488+1144883 50338
                                                     92421089 69174150286199923 97729 80655
                                                 0
DL119
           +38 510+1144893 50418
                                                 ()
                                                     90421729 69159150142199955 97628 60524
                                                     90421762 69132150049199982 97602 80465
01120
           +38 528+1144911 50513
                                                 0
DL121
           +38 548+1144918 50608
                                                     91421799 69121149979200011 97588 60421
                                                 0
           +38 568+1144932 50638
DL 122
                                                     95421835 69099149920200040 97528 60354
                                                 0
01123
           +38 586+1144947 50755
                                                     92421668 69077149651200066 97546 60329
                                                 0
DL124
           +38 607+11a4957 5090S
                                                     92421907 69061149870200098 97576 80407
                                                 0
DL 125
           +38 629+1144962 51010
                                                     94421947 69053149922200130 97798 60494
                                                 0
                                                   125422669 68655149396200234 99942 81091
DL126
           +38 700+1145232 5300Y
                                                 0
01127
           +38 676+1145134 5160Y
                                                    106422028 68799149778200196 98141 80643
                                                 U
DL128
           +38 603+1145241 5243Y
                                                    125421890 68046150020200091 99272 81514
                                                 0
DL 129
                                                    103421889 68778150665200088 98635 81104
           +38 601+11/15151 5170Y
                                                 Û
           +38 537+1145168 51744
DL130
                                                    120421770 68756150257199495 98946 61421
DL131
           +38 473+1145212 527RY
                                                    116421050 68094149893199902 99964 61779
                                                 C
DL132
           +38 504+1145112 5124Y
                                                    133421711 68839150577199947 08853 81509
DL 133
           +38 443+1145141 57324
                                                    242421597 68799146975199857101065 81757
                                                 0 120421543 68696149921199816 42956 82069
           +36 415+1145212 52974
DL 134
           +38 342+1145223 5248Y
DL135
                                                    124421407 52063150165199709 99845 62072
DL136
           +38 263+1145191 51861
                                                 0 124421262 58734150350199594 99563 51994
           +38 310+1145107 51208
DL 137
                                                   125421352 60054150770199003 99292 01954
()L138
           +38 325+1145016 50380
                                                    101421383 68484150452199684 98681 61596
                                                O
DL139
           +38 350+1144910 49858
                                                O
                                                     93421433 69141151038199721 98231 61321
DL 140
           +38 420+1144945 5008Y
                                                     97421561 69090151205149823 96511 61521
                                                \mathbf{e}
DL 141
           +38 444+1145021 50320
                                                   112421503 58974151110199859 98507 81555
                                                (,
DL 142
           +38 495+1144956 50378
                                                     97421099 69067150666199934 98136 81093
                                                r)
DL143
           +38 531+1145026 50708
                                                 ()
                                                     98421761 68963150334199986 98062 60866
DL 144
           +38 619+1145034 50870
                                                    106421926 58948150251200115 93010 60766
                                                 0
DL145
           +38 716+1145057514017
                                                ()
                                                    105422105 68910149637200257 97953 80527
DL 146
           +38 685+1145003 51134
                                                    102422049 68990150026200212 97934 80597
                                                 0
DL 147
           +38 738+1144407 51914
                                                     04422151 69126149726200269 98264 60673
                                                 ()
DL 149
           +38 575+1144812 5058S
                                                 n
                                                     45164 1957P 1200021415600 504 504150 PG
DL 150
           +38 494+1144/69 50188
                                                 13
                                                     97421704 69341149/50199432 97043 60025
                                                     97421015 6941514980[199860 96936 79997
DL 151
           +38 445+1144720 49938
                                                 0
01.152
           +38 517+1144064 50576
                                                     98421750 64493149317149466 97003 79353
                                                C
           +38 597+1144702 50926
DL153
                                                   101421897 89434149325200683 97164 79897
                                                O
DL154
                                                    16138 5-116 16100631264101489 340524201
           +36 675+114867551891T
DL 155
           +38 735+1144663 52488
                                                    58400 T7546 48500557194108480 221550401
           +38 721+1144764 5171Y
                                                0 108422124 69344149720200264 98121 60590
DL156
CL157
           +38 058+1144783511011
                                                     96422407 69313149705200172 97674 80326
DL158
                                                0 108422076 69630149314200222 94531 60725
           +38 692+114456152529T
06159
           +38 606+1144592 51678
                                                0 101421917 69595149195260096 91727 65205
           +38 526+1144553 51150
                                                0.106421771 69655149352193979 97511 60171
DL160
DL 1o1
           +374502+1143002 55398
                                                0 137413059 71010146347197022191492 32737
           + 374574+1143720 54858
                                                 0 123418191 70950146514197127101039 82424
DL163
PL165
           +374617+1143638 5495Y
                                                 0 14941H273 714831467471971K9111274 K2KKI
DLIGA
           +374679+1142674 54164
                                                0 164418387 71028147/10197280101404 83044
                                                   152418387 71179146154197277101185 62381
DL 167
           +374077+1103571 55584
           +374665+1143445 57505
DLIBR
                                                    145719370 71364145519197259102377 82930
                                                C 220413232 71469143454197150103443 62457
DL 169
           +374590+1143417 00718
DL 170
           +374517+114446 59628
                                                   17n41nu9n 71345143794147(44102024 02010
                                               1 4
                                                   154418506 71342145464197364102533 62962
PL 171
           +374740+1143458 57844
                                                 0
           +374745+1143518 5722Y
DL172
                                                    141418515 7125 1145725197376102205 82852
DL174
           +374782+1143562 50418
                                                   -145418581 71187145831197436161491 52416
                                                 Λ
DL 176
           +374786+11, 1275 55675
                                                   -176418000-71004147c91197436131493-42477
           4 $7 166 $1 4 4 4 6 6 7 1 7 7 % Kg - 70
                                                                   The Following to the state of t
F1 1 10
```

STATION LAT. LONG. ELEV. TERMOUR. NORTH EAST ORSV THEC 1944 CHA-IDENT, DEG MIN DEG MIN +CODE INJUUT UTM UTM GRAV GRAV +1000

DL179 +374819+1143351 56578 0 193418658 71495146298197484102055 82953 DL180 +374823+1143422 57638 0 1784180n3 71391145024197490102370 62692 +374880+1143174 54338 184418778 71/52146531197573100090 81743 DL 181 DL 182 +374901+1143356 591AY 0 235418809 71484144/06197604102797 82849 DL183 211418801 71308144286197601102657 62535 +374899+1143476 59474 0 DL184 +374860+1143578 5831Y 184418725 71160144955197544132290 62557 (. DL 187 +374939+11032A9 5787Y 284418882 71580145474197554112284 62825 () DL 190 290418955 71233142648197725103729 62776 +374983+1143524 62288 \mathbf{G} DL 191 SC4419006 71053144002197767134536 82902 +375013+1143046 60075 O. DL193 +375062+1143555 64735 34 346419100 71184141449197639164535 82838 DL199 0 297419162 70952145118197893102792 82952 +375099+1143712 59044 DL200 +375114+1143734 58274 0 297419189 70919145046197915162572 82995 DF505 0 504419378 71087141131198061104372 82662 +375214+1143616 65135 **DL205** 9+1100375 46305 127420821 69939150244199223 96477 60130 +38 DL206 +38 48+1140470 48305 0 117420090 69793150415199280 96591 80234 DL207 78+114/13R046442T 0 144420948 69923150545199323 98812 80435 +38 BOSJO +36 123+1144454 4801Y 0 128421029 69510150413199389 95770 60318 01.209 +38 86+1104286 49400 0 137420967 70065150268149335 97423 80711 DL210 + 38 41+1144177 5100Y 0 152420887 70227149486199270 93713 81470 **DFS11** + 38 19+1143951 55824 C 550450858 70559146681199838 99919 81109 DF515 + 38 57+1143794 629AY 0 453420931 70787142852199293102797 81756 0 27542098A 70030145509149541100560 0099n 06213 +38 90+1143900 575AY DL214 +38 108+1144005 54457 0 201421017 70476147618199367 99495 61151 01215 + 38 81+11ma090 5249Y 0 177420964 70352148954199328 99025 61299 0 155420960 70192150049199328 98482 61326 + 38 81+1144200 50751 DF519 414421098 70134143121199426101583 31022 DL218 +38 148+1103627 0150Y DESTO +38 150+1143918 57348 262421098 1000114505014942910 1193 60898 () DL250 186021127 70348148590199456 99672 81542 + 38 169+11/4/090 53704 (1 212421123 70187150227199456 95750 51575 00221 +38 169+1144200 5098Y 0 DF555 +38 167+1144310 48614 170421115 70027150016199454 97097 80519 0 DL223 +38 172+1144386468711 133421122 69912150164199461 95694 80159 0 DL225 32000 09000114001 40086 0 117421169 69506157029199501 95699 50077 95510 +38 260+1144306494591 129421284 646911.447619996 96936 86196 01227 +38 279+1140498 49470 117421316 69747149056149617 96605 80051 01.228 +38 237+1+a4273 4971Y 185421246 77078157050199550 97875 01107 DF554 +38 218+1144127 58364 6 275421216 70292145596199526100995 61365 DL230 0 1994211NS 70452147004199501 99945 81376 +38 199+1184018550201 0 237421214 705721450281995211 00280 80505 DL231 +38 213+11/3936 57561 DL 232 + 3H 240+1143867 BOURC 6 292421267 70671144132199560161162 30963 DL 234 +38 302+1143092 59761 0 240421380 70032144493144651161086 00945 2 187421352 70475146609149532100446 61330 DL235 + 34 289+1144000 5600Y DL 236 +38 273+1144074 57154 0 163421320 70367146576199609101751 91425 DL 237 + 34 0 327421322 70210146460199613100569 81503 276+1144181 5655Y DL23A + 38 1n772135n 700 7150370179044 9n018 81039 297+114450h 5024Y DF 534 + 44 -351+1+44403502001 0 131421452 69682149854199725 97558 60367 DL240 0 111421539 69775149537149793 47317 5018/ +38 399+11/44475 50550 Dt.241 +38 444+1144410510101 130421024 69568149776199659 97910 60541 01242 +38 416+1144307 54514 0 175421576 70020149386199818 99869 31452 DL243 + 34 350+114/1242 5453Y 193421456 71118148374149721 49973 81567 DL 244 + 311 345+1144159 0216Y 468421450 70239143330199714102126 61387 76245 104421448 71541145924149706101945 81568 + 38 3924C + 295 1111 ١. DESAN 159421494 704371463131997451 10527 01132 + 34 366+1144023 57534 α 103421512 70352145358149761171022 81100 DL 247 + \$8 377+1124UA1 SANGY r) DEZUR +38 420+1144123 55046 142421590 10289141404191023 09951 61124 5 253421480 70084143647199724101562 BADOCS 01240 + 38 355+11/12855 01144 0 17342157a 70517144942149006100272 00447 DI 251 + 4H 40H+11139K7 58530 . 7 : The state of the State of PARENT CONTRACT ON CONTRACT CO 3 (

STATION LAT. LUNG. ELEV. TERMICOR. MORTH EAST URSV TOLE FAR COM-IDENT, DEG MIN DEG MIN +CODE TAZOUT UTM UTM GRAV GRAV +1000

STATION LAT. LUNG. ELEV. TER-POR. WORTH EAST HASV THEC 634 IDENT, DEG MIN DEG MIN +CODE TN/CUT UTM UIM GHAV +1000 GRAV DL 319 +373984+1143763 57444 0 141417098 70930143156196266100960 81510 DL 320 +374000+1143840 SRUIS 144417125 70807143175196290101482 81846 DL 321 +374020+1143955 59028 160417158 70646143052196319162281 62311 DL 322 +373994+114/1034 62078 283417105 70531141568196280103729 62641 0 DL 323 +373962+1144101 63768 384417045 70434140518196234104366 82944 541417101 70304139967196280103492 02542 DL 324 +373994+1144188 53528 174 DL 325 251417171 69998146562196342101211 82933 +374036+1100395 54185 172417219 70210147789196376161086 03256 DL 326 +374059+1144246 527AY DL 327 223417251 70342145237196403102103 03022 +374078+1144160 56608 293417187 70482141744196345163164 82527 DL328 +374038+1144066 61385 DL 320 +374071+1143644 5/988 n 135417256 7080014331119n393101486 81845 142417310 70679143407196438101566 81922 04.330 +374102+1143930 5801Y +374166+1143755 57258 129417435 70933144332196531101682 82284 DL 331 134417456 70737143739196552101537 81964 DL 332 +374180+1143888 57785 293417320 70468142512196450102779 82519 DL 333 +374110+1144073 60268 DL 334 +374114+1144253 52215 150417321 70203148182196455160663 03205 ť1 DL 335 +374095+1144359 55598 0 431417282 70048145581196420101472 82942 DL 336 +374169+1144443 47731 0 121417414 69846149638196546 96221 62462 DL 337 +374176+1144471 48008 0 121017427 69886149962196546 98527 02276 6 122417408 699161499975196530 99629 82812 01.338 +374165+1168487 ARREY DL 350 0 130417392 69953149969196517 99487 62415 +374156+1104472 4898Y DL 340 +374147+1144307 49424 0 130417376 69990149744196504 99750 83028 0 139417359 70024149492196489 99917 83054 DL 341 +374137+1144374 49854 DL 342 +374132+1144345 50355 138417351 70067149244196482100147 83112 DL 34 1 +374181+1144278 51388 138417444 70103145012196553100013 03227 DL 344 +374154+1144161 53894 169417398 7053/147154196514101348 63139 +374202+1144126 55511 179417488 70383146c06196584101665 83110 DL 345 DL 346 395417450 70494141636196552102727 62306 +374180+1144053 61038 0 172417437 70574143293196541102178 62264 DL 347 +374172+1143999 58898 DL 348 +374242+1143798 57544 131417574 70000144/54190042101065 82530 (1 DL 349 +374242+1143895 57108 17550 01010150000101000105107 070710571 DL 350 +374256+11444332 44028 C 135417577 69934150253196663 98742 62539 PL 351 +374237+1144376 49598 0 141417544 70017149/79196635 99614 83041 DL 352 +374226+1104217 56508 247417533 70251145565196622102138 63115 DL 353 +374265+1146224 60145 050417601 70239142/51196c76102077 82821 DL 354 736417604 10366140623196676103423 82679 +374265+1144136 62985 01.355 +374251+11440n3 00018 50 271417581 70476142074196655162696 82524 DL 356 +374256+114390K 5070S 30 205417592 70572142002190003102327 02204 DL 357 +374301+1143433 57485 0 164417678 12005144126196125101966 62555 11L 35R +374307+1143dpc 57775 148417693 70822144546196736102114 62563 +374381+1143759 50455 DL 359 6 131417832 70917145667196645101781 82468 DL 360 +374473+1143779 54561 DL 301 +374441+1113632 54314 0 134417941 70807146636196933106817 62427 +374370+1104700 56748 0 138417807 70097144591196629101554 62545 DL 362 DL 36 3 +374456+1143955 56018 0 139417968 70925140656195957102412 85446 +374415+1143984 55055 0 125417887 70585140(6019509518148) 02624 DL 304 OL 365 +374325+1143972 57008 0 134417721 10007144937196763101819 82516 +374325+1144061 59998 DL 304 70 272417718 70416142000196763102498 62379 DL 367 +374374+1144054 57858 M2 227417MN9 10484144592190035102203 62774 DL 36H +374442+1+a4009 5437S 1 132417433 1701214147172196934121408 BEOTH DL 309 +374491+1190131 39063 321414022 70365143191197005132336 8250m DL 370 +374401+1144170 52194 150417654 /031214406/11960/4100650 83179 0 574417710 70519142295196760103042 82876 DL 471 +374323+114416K 61108 DL 372 0 159417708 70173148451198788160703 05090 +374324+1144267 52643 +374289+110/1319 54795 15m 45454 543561111491444444901 Shutthbry DL 3/1 121 37 J +3/4345+1146499 47717 6 112417743 69993150000190142 94400 62306 A CONTRACTOR OF A CONTRACTOR O ハン マナビ A \$ 70 \$2 to the column to 5

STATION LAT. LONG. ELFV. TERMOR. NORTH FAST ORSV THEC FIN 084 IDENT. DEG MIN DEG MIN +CODE TNYOUT GIN DIN GRAV GRAV +(36)

STATION LAT. LUNG. ELEV. TER-COR. NORTH FAST CORV THEC FAR CHAILDENT. DEG MIN DEG MIN +CODE TN/DUT UTM UTM GRAV GRAV +1/00

STATION LAT. LONG. ELEV. TERMOOK. MORTH FAST MRSV THEC FAR CHAIDENT, DEG MIN DEG MIN HOODE TN/OUT WITH GRAV GRAV HIBGO

STATTON LAT.

LONG. FLEV. TER-COR. MORTH FAST

C .5 %

GRSV

THE (

STATION LAT. LUNG. FLEV. TER-POR. NORTH FAST DASV 1460 CHA IDENT, DEG MIN DEG MIN +CODE TUDGET ST M 11 14 GAAV 6 - AV **+1**36€ DL 757 +375891+1144493 47775 0 109420598 59771149738199050 95644 79460 DL758 +315878+1144470 47720 111420575 64005149674199031 95551 79305 DL 759 +375853+1114481 47645 109420529 69791149559198995 95398 79258 DL7on +375831+1144490 47565 109420488 69778149505198963 95301 79166 DL-761 127420544 6996/149635199003 95794 79555 +375859+1144360479891 +375864+1144236 49614 DL762 0 142420558 70149149724199611 97397 80618 0 132420445 /0001149854198924 96125 79875 **PL763** +375805+114433948031T +375787+1144422 47468 0 119420409 69860149553198898 95319 79250 **DL764** 0 121420249 69653149457198773 95104 79126 PL 765 +375701+1144439 47208 DL 706 +375727+1104333479401 0 133420301 70013150080198616 96386 80158 DL.767 +375789+1100224 49868 0 150420419 70170149835198901 97857 81001 DL768 0 170420306 70202150196198810 98281 81455 +375727+1144204 49634 DL769 +375653+1140219 49094 0 186420168 70183150730198702 98226 81669 DL770 +375648+1144303476411 149420156 70060150769198695 96907 80507 DL 771 +375636+1144392 46984 131420130 69931149717198677 95254 79362 りレフファ +375625+1144481 47117 108420107 69001149329198661 95003 79043 りレフフィ +375542+11/44420 46778 124419956 69394149576198540 95053 79225 PL 774 +375528+1144337/ 46708 151419933 70016150289198520 95719 79941 DL 775 +3/5579+11402764/3101 C 177420629 /0163151205198594 97133 61174 +375491+1144254475491 9 186419867 70139151422198466 97710 61676 DL 776 04777 +375472+11/14481 +6645 11,441,0020 96000149441198436 90096 74131 OL 778 +375458+1144374 46078 0 142419802 69965150256198417 95762 79966 0 138419734 70071151088198362 97390 81341 Dt. 179 +375420+1144303474611 +38 762+1144385 56184 DL 780 50208 32289 45500530474108800 515554801 0 +38 761+1144303 57758 DL 781 0 126422214 70014146564200323100693 81122 DETHA +38 771+1+442225 56277 0 124422236 70123140358200338 98979 79911 126422315 70050146385200402 49506 80235 +38 815+1140270 Snd7Y 06783 DL 784 +38 807+1144121 58564 148422295 69635145479200396100204 80379 01.785 +38 819+1148491 5702Y a 122422315 69733146537200408 99794 80468 DLINA +38 873+1144352 5747Y 10 122422420 69433146349260467 99447 60477 DL787 +38 922+1144445 56854 0 136422507 69795146689200559 99635 80381 DL 788 +38 755+1144039 57126 128422213 70396145450200314 93694 79540 (1L 789) +38 794+1144118 5761B 0 130422282 70275145386205371 99233 79714 DL 790 +38 794+1143968 57024 18599 95169 175005080641569401 885554641 DL 793 +38 834+1143876 56474 202422365 70027146112200436160712 60972 DL 795 438 430+14034R3 6304Y | 155422539| 70470143380200570102142| 80796 DLBon +38 892+1144276 6034Y 149422458 70043144713200515100989 80556 01.801 117422691 69735146295200705 19697 60205 +381022+1140483 57498 OLAGI +36 997+114/1400 60/31 150422647 64657144794200666101264 61726 DL804 +38 903+1144323 01174 164422587 69971144706200619101060 80560 DLAUS +381005+1104263 06581 386422657 70057141123200680103109 80787 OLAII +38 957+1143793 01534 0 124422596 70746144353200609101466 80672 01810 +381068+1144425 5953Y 0 125422/78 69016145/34200772100989 8(610 LLUZ1 +381149+1100444 6168Y 79 161422927 69794143796200691130957 60163 **PL824** +301213+1144420 58724 125423046 6981014530426098410018a 50281 DL829 + 375 334+1143674 55098 0 504414007 /099614142319824410444 6 02/40 PLH 39 +374176+1145261 50311 0 121417400 55719148442196546 99244 62205 DL840 +374174+1145289 50731 0 127417396 66678148285196543 99485 82309 DLBAT +374173+1145315 51111 0 133417393 68640148168196541 94727 82428 +374175+1105342 5157Y DL847 104417376 : 8660147456146545 99445 62564 +374177+1145365 51911 159417399 64546147866196548199176 67626 PLAAT DL844 +374140+1145395 52334 182417403 68522147756196552130463 62317 +374179+1145423 52656 0 196417400 68461147739196551136789 6362K DLBUS +374161+1145454 53304 0 220417403 68435147516195553101125 65166 PLAUS DL 847 +374180+1+45482 53/21 0 232417400 68594147332198552161332 83241 DLB48 A 223417411 AH35414/12314656110144/ 6326/ +374186+1145504 54126 Sugartista was strange to the transfer of the court of the DIRIO ▲スプル1のフェリモルにいわり ちゅんしい

}

STATION LAT.

LONG. ELFV. TER-COR. NORTH FAST

CHA

URSV

THEL

```
IONG. ELEV. TER-COR. MORTH FAST
                                                                           CASV
                                                                                     THEC
                                                                                            16.6
                                                                                                       CH 4
STATTIN LAT.
IDENT. DEG MIN DEG MIN +CODE TN/OUT BIM BIM GRAV GRAV
777744 ******* ********************
                                                   94417407 69426149118196539 95953 86327
DF350
           +374171+1144780 46098
                                                0
DL921
                                                    95417406 69386149134196539 95990 80362
           +374171+1144607 46128
DFaSS
           +374172+1144d76 4628S
                                                    25417416 69245149157196541 96171 60481
DF 351
           +374171+1144902 46445
                                                    94417403 6924/149154196539 96319 60574
                                                ΰ
DL924
           +374173+1144928 46508
                                                    96417406 69209149165196541 96478 80680
                                                0
          +374174+1144957 46625
01925
                                                    94417407 69166149221196543 96739 80665
                                                ()
01926
           +374172+1144983 47025
                                                    95417402 69128149307196541 57017 81075
                                                0
DL 927
           +374172+1145010 47298
                                                    96417401 69080149349196541 97313 61280
                                                Ü
DL92A
           +374172+1125037 47546
                                                0
                                                    98417400 69646149346196541 97546 61423
DL929
           +374173+1145057 47786
                                                0 100717402 69019149255196541 97089 81493
PL930
           +374174+1145083 47985
                                                0 101417403 68981149232196543 97842 61579
                                                0 104417396 68941149125196539 98042 81672
DL931
           +374171+1145110 48300
0L932
           +374176+1145134 48545
                                                0 105417405 68906149355196546 98190 81740
DL933
           +374172+1145162 48900
                                                0 108417396 680651488882196541 98368 81797
DL934
           +374177+1145204 49490
                                                0 112417404 68603148642196546 98670 61302
DL935
                                                0 118417403 68763148567196546 98924 82043
           +374177+1145231 49845
DL936
           +373819+1144556 503PU
                                                0 147416764 69771148214196026 99602 82566
DL937
           +373625+1144643 49270
                                                0 124416772 69643148259196634 98592 81911
DL938
           +373819+1144722 48500
                                                0 117416758 69527140570196026 98188 61763
DL 939
                                                0 122416903 69690148730196137 98359 81695
           +373895+1144009 48635
DL940
                                                  162416929 69846149080196154 99793 82970
           +373907+1144502 49800
DL941
                                                   109416921 69520145691196154 97477 61371
           +373907+1144724 47546
                                                  120415985 69719149092196201 98518 81974
06442
           +373939+1144588 48270
DL 943
           +373994+1144502 48920
                                                0 127417040 69843149349196280 99107 62549
DL 944
                                                0 112417086 69678 49147196280 97567 51491
           +373994+1144614 475211
DL 945
           +373995+1144724 46730
                                                0 106417084 69516148989196282 96700 80007
DL946
                                                0 114817650 69815149794196408 98695 82133
           +374081+1144518 47728
DL947
                                                0 105417248 69056149302196409 96023 61007
           +374082+1144625 4668S
DL948
                                                0 100417247 69514149052196410 96251 60546
           +374683+1144/23 40340
DL949
           +374211+1144533 46755
                                                0 108417490 69787150232196597 97631 81793
DL950
           +374232+1144637 45866
                                                0 100417525 69634149440196626 95971 60429
01.951
           +374259+114/1721 45846
                                                    94417572 69509149179196667 95652 60111
                                                ()
01.952
           +374278+1144561 45988
                                                   104417613 69743150306196695 96862 61303
           +374346+1144607 4560G
DL 954
                                                    97417737 69675149475196794 95754 00260
                                                {\mathfrak t}^{\, \nu}
DL 955
           +374346+1144717 45000
                                                \mathcal{O}
                                                    92417733 69511149217196794 95525 79996
DL 956
                                                    94417046 69044149423196880 95635 80111
           +374405+1144025 457911
                                                0
DL 957
           +374430+1144
                                   45955
                                                0 102417895 69795150159196916 96485 80915
           +374432+1144.
DL 458
                                                    89417892 69467149245196926 45427 79895
                                     3868
                                                ()
           +374495+1104785 45608
DL 959
                                                    89418006 69405149309197012 95394 79667
                                                ſ
DL960
           +374445+1144588 45678
                                                    93418013 69694149621197012 45777 60225
DL961
                                                0 124417999 6877/149764197017 98974 82545
           +374499+1145212 49125
DL962
                                                  100417979 59986150170196956 97163 81335
           +374457+1145003466991
                                                \mathbf{e}
DL903
           +374432+1144918 46105
                                                    98417885 69212149613196920 96077 8695 1
DL964
           +374432+1145962 47310
                                                   105417680 69001150284196926 97686 61357
                                                  113417077 68654149905170920 98426 51484
DL965
           +374432+1145162 48545
DL966
           +374348+1144940 4638H
                                                   96417729 69183149547196797 96396 60575
DL967
           +374363+1145015468901
                                                   101417754 69073149416196819 97226 81534
DL968
           +374348+1145105 47760
                                                   111417724 h8941149867196797 73018 61339
DL969
           +374340+1145161 48350
                                                   118417722 68859149055196797 93374 62401
DL 970
           +374289+1175025471191
                                                   100417517 69061149784196711 97417 61446
DL971
           +374252+1144926 46505
                                                   -95417571 69208149303196672 96392 80525
                                               (,
01912
           +374248+1145120 48135
                                                6 111417536 58923149515196651 98166 81655
DL973
           +374218+1145227 49490
                                                0 124417479 6H76/148763196607 9H751 61796
DL974
           +374118+11050414/720T
                                                    48417300 6904514912619646c 7/5/4 81396
DL975
           +374087+11/14936 46728
                                               0 100417247 69201149011196416 36563 60724
DL.976
                                                0 100417087 69194149384196291 3KK34 KOUTA
           + 474001+1144443 46605
NI 0 77
           * マナバッファ・・・ P いっしゅつんりゃて
                                                   AND CONTRACTOR OF STATE OF STA
```

LONG. ELEV. TER-FOR. MORTH FAST

STATION LAT.

IDENT, DEG MIN DEG MIN +CODE

8 R A

+1000

THEC

GRAV

URSV

GRAV

UTH

THIOUT HITM DL 978 0 110417240 68902148741196416 98137 81644 +374087+1145139 48685 DL.979 0 122417270 68/79148556196443 98830 62021 +374105+11/15222 49648 01.986 0 126417110 08904148339196314 98365 81097 +374017+1145140 49240 DL982 +373912+1144949 47128 0 102416923 69189149219196161 97402 81433 DL983 +373949+1+45060475391 0 130416987 69024149099196215 97624 81539 01984 +373907+1145162 49000 0 115416906 68376148019196154 98544 81742 DL985 +373890+1145217 49908 n 110416884 68796148154196136 48976 62068 0 102416826 69009148589196088 97711 61428 01.986 +373862+114507346041T 01987 104416751 69124148725196027 97447 61335 +373820+1144996 47558 DL288 101416745 68085148c13196u27 98130 61560 +373820+1145158 48620 DL989 +373776+1145086481001 101416666 68993148630195963 97333 81029 100416473 68793147425195814 97380 80893 DL990 +373674+1145225486291 DL991 +373692+114508948090T 0 114416511 68992147649195841 97066 80778 0 105416526 69095147567195651 97322 80596 DL992 +373699+114501948461T **DL993** 0 108416543 69243147276195661 97595 80966 +373706+1144918490717 DL994 0 117416576 69396147407195884 98070 81517 +373722+1144814494591 DL995 +373726+1144696 49954 0 139416587 09569146045195890 99166 82268 DL996 +373736+114460051191T 0 159416609 69710147787195905100659 62759 DL397 +373714+1165955 49710 99416523 67/1/147950195673 98860 62005 01.798 +373732+1145822 50900 109416561 67912147197195899 39201 61640 DL999 96416484 60182147027195034 96212 61172 +373687+1105600499611 101416561 68236146462195693 98614 81363 DL1000 +373728+1145602 50525 95416457 68397147100195809 98271 81245 DL1001 +373670+1145494 49928 99416444 68579147127195795 97841 61064 DL1002 +373661+1145371 4942S DL1003 +373672+1105259 48610 99416468 68743147415195812 97539 86496 7741-573 58720147414195895 97822 81134 DL1004 +373729+1145273 4920U DL1006 +38 775+1145748 5537Y 0 102422193 67896146948200345 98714 79931 DL1007 +38 864+1145749 5678Y 0 114422356 67693146568200473 49553 60301 DE1008 +36 952+1145749 5615Y 0 126422518 67889146200200602100325 60618 DL1009 +381023+1145715 63714 0 265427051 67936143097200706102354 66884 DL1010 +38 928+1145055 5891Y 0 139422477 66028145896200567169773 80619 OLIO11 +38 853+1145693 5768Y 0 114422337 67975146254200457100270 80643 061013 +38 874+1145574 5903Y £ 138422380 68148145816200486100885 80889 0 125422250 68230146974200384166442 81051 DL1014 +38 803+1145520 5722Y DL1015 +381001+1149578 6144Y 0 173422015 6613/144579209674101631 61049 DL1016 +38 942+1145520 6150Y 0.152422507 68224144412209588101707 69663 DL1020 +38 805+1145289 5487Y 132422262 68567148051200387 99304 80722 DL1021 +36 464+1145310 5566Y 163422370 68534147628200473 99482 69681 DL1022 +38 906+1185362 5852Y @ 136422446 68457146058200535100600 66776 OL1023 +38 951+1145308 5659Y 0 160422531 00533140079200601 99537 80195 PL1024 +38 998+1149408 6039Y 0 175422615 68385144733200670100902 80489 DL1027 +381008+1105307 58231 0 179422710 68531145657200743130717 81636 DL1024 +38 0 130420837 68497146396199262100569 61564 36+11:45359 56164 DL1030 +38 0 120461434 66626146292199337 49649 61557 ×1+1105260 5613Y DL1031 +38 128+1105400 5583Y 1 133421406 65434147309199397100456 61547 DL1035 +38 173+1145297 53547 0 137421092 66562146768149463 99693 81569 DL1034 +38 217+1145250 5290C 0 123421175 68640149299199527 99557 81634 0 124421187 68001148939199537 99727 61631 DL1035 + 38 224+1145283 53426 DE1030 +38 230+1145311 53950 -117721197 68559148639199546 99867 81585 PL1037 +38 234+1145375 54768 129021204 68520106177199552100152 (151. DL1035 + 38 244+1105364 55768 6 146421221 64481147543149566107555 61643 DL1042 +38 492+1145291 5300Y 0 128421516 64561147242197790100077 81856 PL1043 + 3H 439+1145573 5446Y 99421583 68519148703199852130103 81624 DE1040 +38 565+1145535535991 1 111421512 68514149135200033 99331 51244 PL1047 +39 563+114843754659T 93421009 68361148264200033 99073 81125 90121765 63415140025200108 33850 61125 DL1948 + 38 614+1145399 55184 A THEODORO CHEMINATOR CONTROL OF THE CONTROL DETUGE ARE ADEATERS ATO SHARE

STATION LAT. LONG. ELFV. TER-COR. NORTH EAST JRSV THELL (11) IDENT, DEG MIN DEG MIN +COOF INJULY UTM UTM GRAV GRAV 41000 DL1052 +38 743+1145457 55060 0 130422141 68325147956200296100044 61190 DU1053 +38 715+1145540 55c26 0 101422087 66204147772200255 99862 60933 DL1054 +374509+1143837 53934 0 120418066 70796146763197032100492 82215 DL1055 +374504+1143989 5815Y 309418051 70573144008197024102312 82788 148418107 70136150419197077 99785 83101 DL1056 +374540+1144286 4935Y 0 PL1057 +374515+1144401 46764 112418057 69968151381197041 98346 62509 Ō PL1058 +374527+1184491 4640C 97418076 69835150108197056 96716 60987 0 DL1059 +374586+11/10489 4650C 94418185 69035149916197144 96533 80767 () DL1060 +374590+1144414 4697Y 0 102418195 69945150762197150 97819 61901 DL1061 +374601+1144320 47614 118418219 70483151409197166 99048 62928 DL1062 +374563+1144159 5621Y 0 253418154 70321146090197111101882 82963 DL1063 +374576+1144077 5441Y 0 128418181 70441147012197130101090 82661 DL1064 +374592+1143963 5466Y 0 129418215 70607147055197153101345 82831 DL1065 +374568+1143688 5301Y 0 125418173 70719147447197116100218 62263 0L1066 +374576+1143792 5421Y 0 118418192 70859146593197130100482 82111 DL1067 +374619+1143053 52581 0 132418269 70768147/16197192100006 82207 DL1068 +374696+11/13763 5416Y 0 142418415 70896147049197305101316 62986 DL1069 +374713+11478AU 5273Y 0 167416442 70724148141197330100437 62620 0 123416403 70576148120197302100520 62631 DL1070 +374694+1143980 5201Y DL1071 +374665+1144075 5121Y 128418346 70440149455197259100390 23052 DL1072 +374625+1144139 5575Y 243418270 70347146479197201101767 62975 1) DL1073 +374620+1140230 4928Y 140418257 70205150541197194 99724 83056 DL1074 +374637+1144279 48370 0 122418287 70141151196197219 99216 82943 DL1075 +374642+1144315 47950 109418295 70084151088197226 98988 82743 0 DL1076 +374646+114d345 47730 105418301 70044151058197232 98745 62571 47 DL1077 +374648+1144372 47440 107418304 /0004156926197234 98337 82203 DL1078 +374652+1144398 47230 98418310 69966150706197241 97913 21902 0 DL1479 +374660+1144424 46941 98418324 6992815045/197252 97360 61458 !) DL1080 +374660+1144458 46710 93419323 69878150111197252 96817 80979 0 PL1081 +374661+1144485 46510 92418324 69838149933197254 96449 80678 DE1082 +374699+1144171 4937Y 0 137418405 70297150442197309 99595 62394 DL1083 +374729+1144241 5424Y 513418458 70193146902197353100596 62609 DL1084 +374735+1144354 4744C 101412465 70027150954197362 98238 52158 DL1085 +374745+1144439 4670Y 93412421 69902150123197576 9609c noncl 0 118418501 70430149686197382 99651 62810 DL1086 +374749+1144079 5031Y DL1087 +374789+1144156 4964Y 0 107418572 70315150020197441 99296 82472 DL1088 +374782+1143764 5496Y 0 174418574 70891147392197430101632 83031 DL1089 +374798+1143828 63694 B62414601 70796141698197453103590 62724 DL1096 +374861+1143753 5870Y 195413720 70903145106197545102601 62975 DL1091 +374871+1143545 5942Y 232 330413735 707661444064197560162435 62730 DL1092 +374789+1143957 5130Y 0 158418580 70807149275197441100114 02773 DL1093 +374859+1143949 5196Y 155418709 70010148978197542106536 02709 Û DL1094 +374810+1140076 4967Y 119418014 70431150022197471 99484 02574 DE1095 +374583+1144471 4957Y 122418749 76435149796197577 99156 62262 DL1096 +3/4931+1143751 50424 38 254418850 76903146005197648102657 63116 DL1097 +374950+1103852 5417Y 0 212418581 7075414768/197675161196 6292/ DL1100 +375120+1103760 57724 0 290419190 70H811459H9197923102310 62913 DL1101 +375126+1103785 5729Y 4 255419209 70844146125197932102108 82831 DL1102 +375152+1143H24 5H428 0 255419256 70785146573197970101702 82714 DL1103 +375219+1164855561517 0 241419379 70737140/78198088101555 82545 DL1104 +375165+1143854 55774 0 231019279 70741147020197984191518 82728 C 218419307 70084147436198613101131 02011 DU1105 +375181+11/13892 5494Y DL1100 +375195+1103921 5400Y 0 204419332 70641147642198033101044 82680 DL1107 +37520H+1143944 51674 0 211414355 70007146476198052140913 62581 DL1108 +375224+1143965 5373Y 0 197419384 70575148379198076100871 82742 DL1109 +375234+1103902 53204 0 191417401 70535148845148(9610665) 62856 MI TEEN TETRANTIFE COLLEGE CONTRA PARAGRAPH TRANSPORTATION IN TAILS TO 100010000

IDENT. DEG HIN DEG MIN +CODE TN/UUT HITM

LONG. ELEV. TER#COK. MORTH FAST

STATYON LAT.

r A

+1.160

uRSV

GRAV

UIM

THEE

GRAV

STATION LAT. LONG. ELEV. TERMOUR. MORTH FAST DRSV THEC FULL CASTOFNT, DEG MIN DEG HIN +CODE TNYOUT DIM OF GRAV GRAV +1000

DL1170 +3751 0:1145457 54788 0 149419119 68392147464197902101112 82577 DL1171 +375104+1145322 54048 0 201419115 66591147146197900160167 21076 0 144419216 68516147446197982108495 82146 DL1172 +375160+11a5371 54228 DL1173 +375169+1145262 50698 0 117419237 66676150126197995 99836 02064 DL1174 +375220+1145342 51698 0 153419328 68555148997198070 99767 62222 DL1175 +375199+1145444 56178 0 162419286 64408146577198039101403 82407 DL1176 +375212+1145522 58228 0 226419308 66293145542198056102278 62647 DL1177 +375147+1145521 5608S 0 200419187 68297145575197963100957 81625 DL1178 +375217+1145597 6917S 01207419314 62183136461198665103501 61115 011179 +375119+1145627 65028 236 554419132 68143139824197922103099 61712 DL1180 +375033+1145642 6498S 0 691418973 68124139827197797103190 51718 DL1181 +374949+1145312 50296 1 121418828 68612149787197674 99443 62413 0 111421713 68671150949199948 90383 61959 DL1913 +38 505+1145000 51416 DL1914 +38 640+114489250951T 92021970 69155149937200145 97701 80455 0 DL1918 +375417+1144743 46528 90419713 69426150632198357 46054 80271 0 DL1919 +374203+114543747520T 98417458 69047149399196585 97535 81425 87418065 69552149522197055 95568 80034 DL1961 +374525+1144684 4580U 94418185 6910815(362197157 96909 81163 DL2000 +374595+1144984 4644U DE2001 +374598+1105011 4666Y 97418189 69066150495197162 97245 81426 DL2012 +374599+1185038 4654Y 6 101413190 69029150603197163 97521 81646 0 10041R193 68990150021197160 97827 81040 DE2003 +374601+1145064 4715Y DL2004 +374593+1144089 4774Y 100018177 6895415(561197155 98334 62151 () DL2005 +374592+1145115 4776Y 112413175 68916150389197153 98183 52005 DL2006 +374590+1145178 4873Y 121418169 68824149805197150 98515 62016 DL2007 +374590+1145204 4918Y 115418168 68785144020197150 98762 02103 G. 75954 +374589+11a5232 49624 \mathbf{c} 126413165 68744149501197148 09056 82252 DL2009 +374588+1145260 5010Y 0 125418162 68703149432197147 99435 624/2 DL2010 +374586+1105313 5118Y 6 137418157 68626149313197144100035 82716 0 149418154 68589146645197143100132 62672 DL2011 +374585+1145338 5163Y 0 179418150 68549148378197146100260 82666 DL2012 +374583+1145365 5211Y DL2013 +374585+1145402 52868 0 175418152 68495147989197143100594 62740 0 283417008 67789147053196253160303 62546 DE2060 +373975+1145899 5200Y DL2061 +374060+1105930 55528 0 347417164 67741145373196377101249 62659 DL2062 +374127+1105921 56836 0 248417286 67/51144/02196475161/13 82576 DL2063 +374190+1105916 55496 0 249417405 07753145825195560101499 82313 DL2064 +374360+1145508 5545Y 0 230417732 66344146229196814101601 82416 0 158417576 68622146691196686 99676 02683 062065 +374272+1145324 50870 DL 2060 + 375864+1144450 47548 0 115420550 69835149648199311 95479 79337 DL2067 +375852+1144427 47065 0 11/420529 59-70149014198993 95473 79335 DE2066 +375839+1144402 47738 0 121420506 69907149603198974 95547 79369 DL2069 +375827+1144381 47758 0 126420484 69938149682198956 95643 79483 DL2070 +375813+1144357 4790C 0 127420459 69974149767198930 95910 79699 DE2071 +375790+1144316 48320 0 136420418 70035 45962198902 96533 80189 DU2072 +375779+1144294 4866C 6 1364×6398 760661 1467198086 96075 86.14 0 141420375 10100149971198847 47217 30966 DL2073 +375766+1144272 4900C DE2074 +375754+1144250 4932C 146420354 70133150012199650 97577 00902 DL2075 +375742+1144224 49020 154427332 70165150006196632 97911 61:41 PL2070 +375716+1144182 5020C 184420286 10235150212198795 98/21 41784 DL2077 +375704+1144160 30736 201420265 71267150082198777 99048 61941 DL2078 +375691+1144137 5164C 221420241 1-502142016198758 39458 02:12 PL2222 +36 741+1143770 6388Y 0 624462197 76790142197200694192027 ACOBT PL 3001 +373951+1143218 53018 1 153417058 71733146503196216130739 02608 06.5002 +374312+1143457 07245 101 474417716 71564138075196745105219 62920 063003 +374715+1143314 00378 251 238418467 71554143027197332193114 63012 DL 3004 +374990+114 x344 67788 581418974 714971390201977341950H2 62553 DL 3000 +3/5547+11/14444 6044Y 5 544420456 1050414112-1946051:3171 F1742 ME TOAT ATTANTEST CONTANT ACTOR A CONTRACTOR OF THE TABLE COURSES CONTRACTOR OF THE CONTRACTOR OF

STATION LAT.

BU BOAR A THE STREET AND A TO A CHEEK

- 1

IDENT. DEG MIN DEG MIN +CODE THYOUT HIM OTH GRAV -- GRAV --DL3000 +38 277+1103657 77785 2 971421343 70977133257199615166856 81301 DL 3009 +38 691+1143650 61558 1 201422109 70967145+392002201/1149 86554 DL3010 +36 741+1143706 6008S 0 154422199 706831444522002941 1081 60607 8 445422715 70036139183200711103154 80169 DL3011 +381026+1144003 6872Y DL3014 +38 704+1145796 5377Y 96422058 67631147777206234 08143 19899 0 DE3015 +38 409+1145464 57/3Y 8 129421523 08328146289199808100815 61262 DL3016 +375996+1145497 60598 115 318420758 68297144156199204101980 81747 DL 3017 +375701+1145334 57028 16 174420218 08545146371198773161263 62665 DL3018 +375612+1145657 52628 1 128420043 68079148694198642 99574 81755 DL3019 +375350+1145561 06008 313 709419562 5823v138747198259103172 01479 CL3021 +374846+1145751 5808S 7 164418023 67972144615197523161755 82116 DL3022 +374434+1145661 6590S 413 579417864 68121138318196923133422 61937 DL3023 +374011+1145712 69558 2821130417080 68063135029196305104187 61877 DL3024 +374260+1145916 55388 249 169417534 67753145620196669161272 82601 DL3025 +373833+115 25 4988Y 0 122416741 67610146314196046 99207 62316 0 178419924 70104151360198511 97100 61241 DL 3500 +375522+1144277 47078 DU3501 +375522+1144277 47078 0 178419924 70104151389198511 97178 81301 0 178419924 70104151399198511 97189 81311 DL3502 +375522+1144277 47078 DL3503 +375522+1144276 47988 0 178419924 70106151405198511 97201 81321 DL3504 +375522+1140276 47098 0 178419924 70106151408198511 97209 81327 DL3505 +375522+1104276 47098 0 179419924 70107151411198511 97220 81336 0L3506 +375522+1144275 4710H 0 179419924 70107151415198511 97232 61345 DL3507 +375521+1148275 47116 0 179419922 70107151417198509 97242 81353 0 180419922 70109151422198509 97255 81365 DL3508 +375521+1144274 47128 DL 3509 + 375521+1104274 4713H 0 186419922 70109151422198509 97264 61370 DL3510 +375521+1144273 47133 0 180419922 70110151426198509 97274 51379 0 179419922 70110151429198509 97283 61364 DL3511 +3/5521+11/4273 47146 6 179419922 70110151431198509 97293 61392 DL3512 +375521+1144273 47158 DL3513 +375521+1144272 47158 0 181419922 70112151437198509 97502 81401 DL3514 +375521+1134272 47168 0 181419922 70112151439198509 97310 51406 0 180419922 10113151436198509 97320 61416 DL3515 +375521+1100271 47178 DE3516 +375521+1140271 47198 0 180419922 70113151441198509 97332 81420 DL 3517 +375520+114/271 4719R 0 179419926 7011315144(198506 97343 81426 DL 3510 +375517+1100257 47510 e 189419915 70134151398198503 97803 81588 DL3519 +375514+1148244 4792H 0 182419910 70153151277198499 97879 81715 DL 3520 +375511+1144231 48318 0 188419905 70172151165198495 98134 61845 DL 3521 +375508+1144218 4867N 0 199417900 70191151 133196471 98343 81943 PL3522 +375505+1144205 49666 0 215419695 70211150575196486 98554 82,44 DL3523 +375502+1144102 49555 @ 234414896 70c30150559198461 59010 62144 DL3524 +375522+1144276 47066 0 177419924 79103151386198511 97161 61285 DI 3525 +375522+1144278 47066 0 177419924 70103151373196511 97119 81275 DL3526 +375522+11/00279 47050 0 17/419924 /0101151365198511 97136 61266 DL3527 +375522+1144279 47056 0 177419920 7310115136(198511 97126 61256 DL3528 +375523+1144279 47040 N 178410925 76401151555198513 77114 61646 DL 3529 + 375523+1100280 47044 0 176419925 70100151344198513 (7115 81237 DL 3530 +375523+11042A0 4763A 0 176419925 731(0)51338194513 4/089 61283 PL3531 +375523+11a/281 47035 1 175419925 70095151331198515 47079 81213 DL3532 +375523+1144281 47034 0 175414725 70096151523198515 97066 61202 DL 3533 +375523+1144281 47028 1 175419925 70095151317198513 97056 81193 DL3534 +375523+1144282 47028 0 175419925 70 59715 105146515 47046 81179 DL3535 +375523+1148282 47013 C 175410426 76-67151298148513 07629 81176 PL 35 30 + 3/5523+1144293 47010 0 174419425 75 195151241198513 97019 61159 DL3537 +375523+1144283 4700H 0 174419924 70695151684198513 47008 81156 DL 3538 + 375524+1144283 47068 0 174419927 7 .:: 951512/7148513 96995 81139 DE 3539 +375524+1144284 46796 1 174417427 70094131271198513 98984 81129 DL 3540 + 375524+1144284 46446 1. 174114427 70691151656194513 45975 MILZI A Property of the Property of the Annual Conference of the Confere

LUNG. FLEV. TERMONR. MORTH FAST GRSV IMEC MAA

LONG. ELEV. TER-COR. MORTH EAST WASV THEE FAA STATION LAT. CBA IDENT. DEG MIN DEG MIN +CODE IN/CUT UTM LITM SQAV GRAV 0 346419941 70202150681198523 96363 80762 DL3542 +375530+1144210 4676R 0 162419942 70035150644198527 46081 80310 DL 3543 +375533+1144324 46726 0 152419947 70016150417198531 95642 80064 DL 3544 +375536+1144337 46716 DL3545 +375539+1144350 46728 0 145419953 6999/150226198536 9505/ 79866 0 142419958 69977150063198540 95502 79705 DL 3546 +375542+1144363 46738 0 179419939 70105151377198523 97153 61277 DL3547 +375530+1144276 47078 0 179419939 70105151381198523 97167 61287 DL3548 +375530+114/1276 47088 0 180419937 70107151334198521 97181 81299 DL3549 +375529+1144275 47498 0 180419937 70107151337198521 97191 81306 DL3550 +375529+1144275 47106 0 180419937 70107151391198521 97263 81316 DL3551 +375529+11n4275 4711b 0 182419937 70108151397198521 97214 81327 DL3552 +375529+1144274 47118 0 181419937 70108151400198521 97225 81334 PL3553 +375529+1144274 47128 DL3554 +375529+1144273 47128 0 181419937 70110151409198521 97232 81342 0 181419937 70110151409198521 97244 81344 DL3555 +375529+1144273 47138 DL3556 +375529+1144273 47148 0 181419937 70110151414198521 97256 81359 0 182419937 70111151416198521 97266 61367 DL3557 +375529+1144272 47158 0 179419939 70104151372198523 97142 81258 DL3558 +375530+1144277 47078 0 180419939 70104151369198523 97133 81262 DL 3559 + 375530+1144277 47069 6 180419939 70104151363198523 97121 81253 DL3560 +375530+1144277 47058 0 178419938 70102151256194523 97110 81241 DL3561 +375530+1144278 47058 PL3562 +375530+1144278 47048 U 178419938 70102151347198523 97098 81230 0 179410938 70101151341198523 97085 61221 DL3563 +375530+1140279 47046 0 179419938 70101151336198523 97073 61211 DL 3564 +375530+1144279 47638 0 179419938 70101151529198523 97061 81202 DL3565 +375530+1144279 47028 DL3566 + 375530+1144280 47028 0 177419938 70099151321198523 97051 61170 0 17A019940 70099151314198524 97037 61179 DL3567 +375531+1144280 47026

DATE